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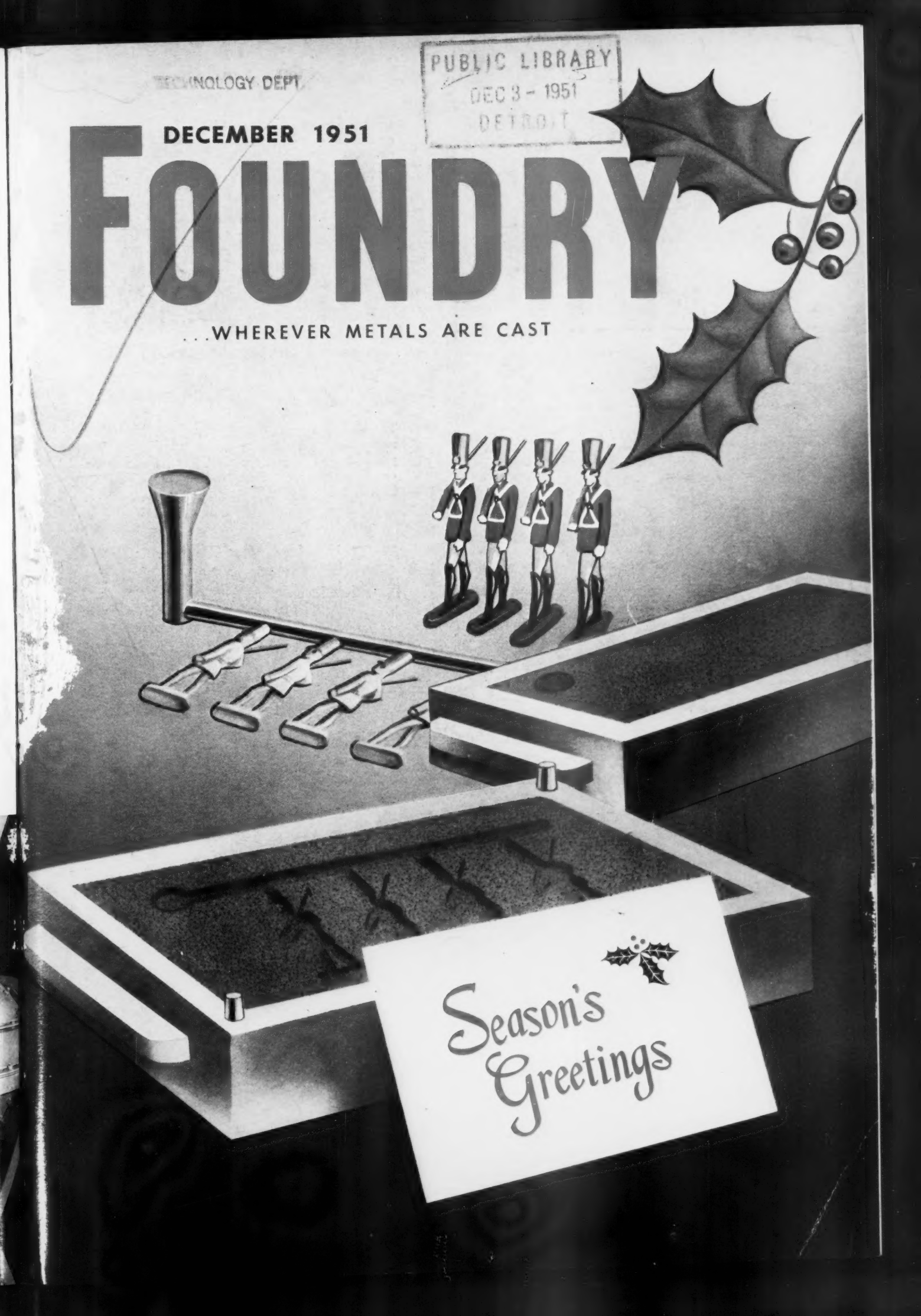
FOUNDRY

...WHEREVER METALS ARE CAST



get CLEANER... SOUNDER... BETTER IRON CASTINGS with PURITE

Progressive foundries throughout the country have standardized on Purite as their desulphurizer and cupola flux for improved iron castings. And their reasons for this practice are seven-fold.

1. **Purite gives 100% fluxing action in the cupola — 100% desulphurizing action in the ladle.**
2. **Purite gets to the iron faster — no quicker desulphurizer made.**
3. **Purite is time-tested and proven for unsurpassed desulphurizing uniformity.**
4. **Purite comes in 2-lb. pigs — no weighing or measuring required.**
5. **Purite is 100% pure fused soda ash — you do not pay for inert materials.**
6. **Purite does not crumble — no waste — no dust.**
7. **Purite can be shipped in bulk carloads at substantial savings over bag shipments — is easily stored without deterioration.**

These benefits prove why Purite enjoys such widespread acceptance among iron foundries as the foremost cupola flux and desulphurizing agent. Write today for full information on how the quality of your iron castings can be improved with Purite. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Md.

PURITE 100% fused soda ash. The Scientific Flux for Better Melting and Cleaner Iron.

PURITE is sold by all leading foundry supply houses in the United States and Canada.

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SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

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NICKEL ALLOY IRONS develop improved properties

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plus all the basic advantages of plain cast iron

PLAIN GRAY IRON is, structurally, a steel matrix containing graphite flakes. Engineering, physical, processing and service properties are wholly dependent upon the character and disposition of these flakes, and upon the nature of the matrix.

The matrix of nickel alloyed irons closely resembles the pearlitic matrix found in high carbon steels, whereas the matrix of ordinary plain iron resembles that found in low carbon steels. Compositions of nickel alloy irons can be adjusted to reduce "chill" in thin sections without risk of forming "spongy" regions in heavy sections. This promotes uniform strength, improved machinability, pressure tightness and wear resistance.

Hardness in nickel cast irons results from improvement of the matrix. Chilled areas and hard carbides, which impair machinability, are obviated. Nickel improves response to heat treating. In fact, use of nickel alone or with other alloying elements plays an important part in meeting a variety of requirements.

Accordingly . . . nickel alloyed irons permit production of castings with high levels of the following properties:

Strength

Tensile and transverse strengths of castings are greatly increased by the addition of nickel to cast irons of properly adjusted base mixture. The ratio of compressive strength to tensile strength is retained. Greater uniformity of strength in thick and thin sections is achieved.

Elasticity

The elastic modulus increases with strength. In this respect nickel-containing irons of the high strength type possess good stiffness and do not deform permanently under loads that would be damaging to irons of lower elastic modulus.

Damping Capacity

The damping capacity inherent in gray cast iron is not impaired by the presence of nickel.

Wear Resistance

The uniformly pearlitic matrix of nickel cast irons appreciably improves wear resistance. The uniformly fine graphite flake distribution, achieved in suitably processed irons *without formation of a poor wearing dendritic condition*, affords optimum resistance to wear and galling.

Pressure Tightness

Characterized by dense grain structure and fine dispersion of graphite throughout, nickel alloy irons are close-grained and offer an extraordinary degree of pressure tightness under high hydrostatic pressures, without sacrificing machinability.

Applications

Heavy machinery frames and *beds* are typical of cast parts that benefit from the rigidity and good damping capacity of nickel cast irons. *Cylinder* and *pump liners, gears, dies, machine tool ways, saddles* and *tables* exemplify parts produced in nickel irons to assure greatly increased strength and wear resistance. And nickel alloyed iron is used for *heavy duty brake drums* to resist heat checking, thermal shock, wear and galling. The nickel cast irons are readily heat treated, and respond particularly well to flame and induction hardening.

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering nickel cast irons for many end uses in defense and defense supporting industries.

The International Nickel Company, Inc.
Dept. F, 67 Wall St., New York 5, N. Y.

Please send me booklet entitled, "Guide to the Selection of Engineering Cast Irons."

*Name*_____ *Title*_____

*Company*_____

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TRADE MARK

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A *very merry Christmas to you and yours*

★ ★ ★ ★ ★

That is the glory of the spirit of Christmas. It triumphs over all obstacles; it breaks down all barriers; it flourishes in all countries and in every heart. For the spirit of Christmas fulfils the greatest hunger of mankind.

—Loring A. Schuler

★ ★ ★ ★ ★

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DECEMBER 1951

FOUNDRY

VOLUME 79—NUMBER 12

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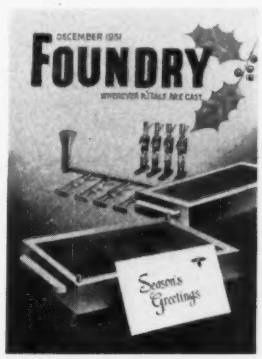

THE COVER: This month members of the *FOUNDRY* organization extend best wishes of the season to readers everywhere

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INDUCTOL

the "pre-baked" core oil

SLASHES BAKING

1 ***Steam end core for turbine casing.*** This core now bakes overnight—12 hours at 420°. Before using INDUCTOL, 24 hours (two nights), were required. Elmer Maving, core boss, looking on.

2 ***Close-up diaphragm core for steam turbine,*** showing stainless steel blades inserted.

3 ***Slicking the core surface.*** No stickiness developed by using INDUCTOL.

ASK YOUR LINOIL MAN ABOUT

INDUCTOL

Write today for your copy of Bulletin No. 108. It tells the whole Inductol *story—every core boss should read it.*

...CIME 50% AT POHLMAN FOUNDRY COMPANY* in Buffalo

*Large chunk cores now bake thoroughly in one night where two nights were formerly required—baking time of smaller cores has been cut from 7 to 4 hours by using *Inductol*.

OTHER ADVANTAGES NOTED

1. ***Core Room Smoke Reduced***—Pohlman really had a problem. Every morning when they opened the oven doors after an overnight bake, the smoke and fumes that poured out were so heavy that the workers couldn't stay in the core room. Work just stopped until things cleared up. *Inductol* completely eliminated this problem.

2. ***Core Blows Eliminated***—Pohlman cannot trace any cut or blown castings to cores since using *Inductol*.

3. ***Better Collapsibility***—Pohlman's *Inductol* cores break up easily in shakeout—have eliminated considerable hand labor.

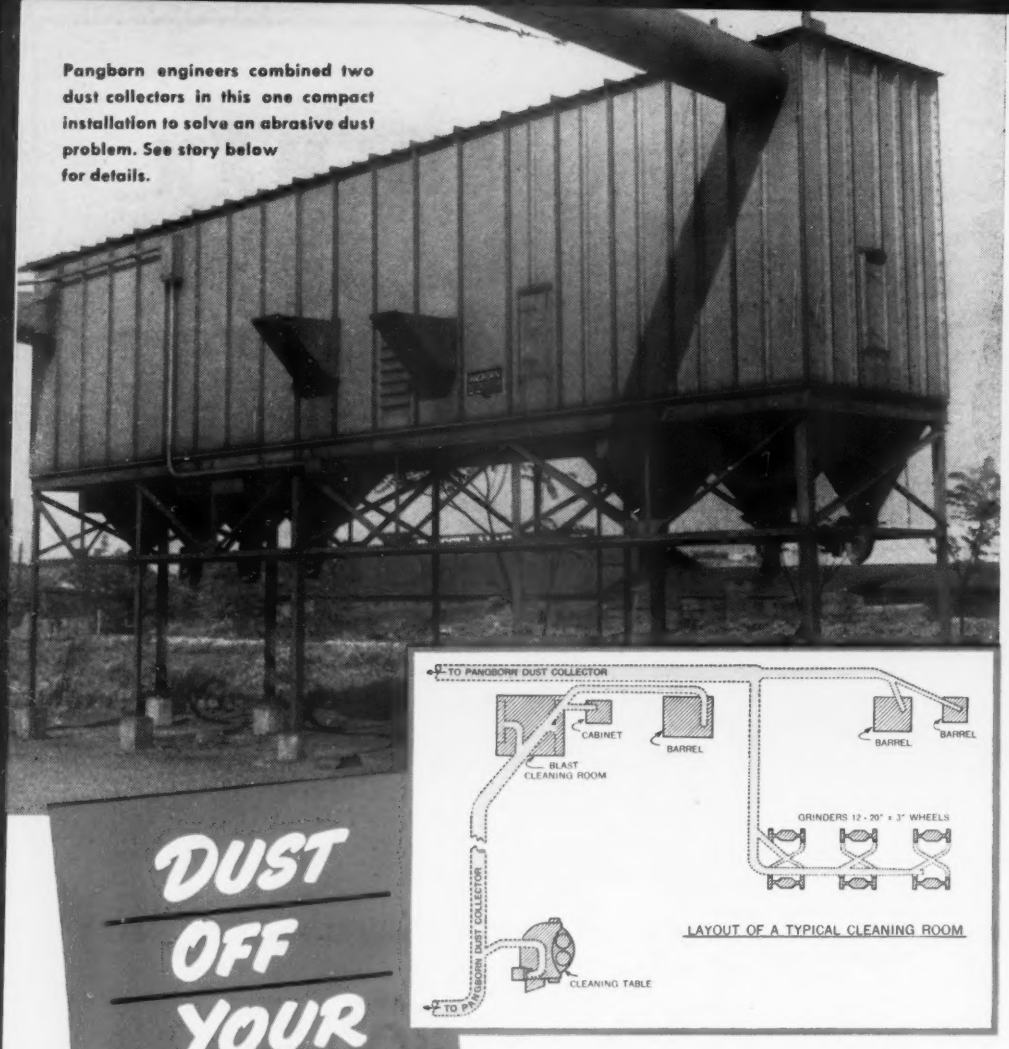
"INDUCTOL has made my job a lot easier, we now use it exclusively," says Pohlman's core boss, Elmer Maving.

Pohlman is a jobbing Meehanite foundry with a big reputation. They cast small to medium work; specialize in complicated jobs—are often called on to help other foundries out of a jam. Find out for yourself why Pohlman, a specialist in the industry, has switched to *Inductol*—ask your Linoil Man. Arrange for a demonstration or trial run of *Inductol* in your core room.

ARCHER • DANIELS • MIDLAND COMPANY

(FOUNDRY PRODUCTS DIVISION) • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

Pangborn engineers combined two dust collectors in this one compact installation to solve an abrasive dust problem. See story below for details.



Most cleaning rooms are a source of dust. Note this room contains 18 dust-producing pieces of equipment!

DUST OFF YOUR FOUNDRY

It's good business to keep DUST AWAY FROM MEN AND MACHINERY with Pangborn Dust Control

FOUNDRY DUST is abrasive dust and nothing can raise more havoc with production. Take a look at this typical cleaning room setup (based on an actual installation). Every piece of equipment is a potential dust maker . . . from the abrasive grinding wheels to the blast cleaning room.

To check dust *before* it damaged valuable equipment, Pangborn engineers combined two efficient type "CH" Dust Collectors in one outside unit. Then dust from all cleaning equipment was trapped by properly designed piping . . . and abrasive dust from the grinding wheels was controlled by efficient hoods.

As a result, this foundry is a comfortable place to work. With Pangborn Dust Control on the job, walls stay cleaner longer. Windows require less washing. Working areas are well lighted. Both men and machines *turn out more work* per day!

GET RID OF COSTLY DUST in your plant. Besides being a nuisance, foundry dust is downright dangerous to men, machinery and production. To find out how you can *stop dust at a profit,* write for Bulletin 909A to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

Pangborn DUST CONTROL

STOPS THE DUST HOG from stealing profits

ADVERTISEMENT

If you haven't heard it . . .

IT'S NEWS!

DID YOU HEAR ABOUT the new perfume that drives women mad? It smells like money.

* * *

FROM AFRICA comes the intelligence that the wild beasts of the jungle will not harm you if you carry a torch—that is, if you carry it fast enough.

* * *

FRIEND OF OURS BACK HOME writes that when a man reaches middle age he is faced with a choice: keep fit as a fiddle or look like a bass viol.

* * *

A POCKET-SIZE WIRE RECORDER which holds up to an hour of dictation has been developed. This new device can serve as an electronic reminder, which makes the old fashioned string around your finger obsolete. However this invention poses an interesting problem: how will the ladies ever again enjoy a comfortable bridge party, when any pocket-book could contain a recorder capable of repeating every word???

* * *

THE BEST WAY TO PROVE TO YOURSELF that water at varying depths has varying temperatures is to put one hand in water about 3 ft. deep and other down about 30 ft. And if you succeed in doing this it will be the neatest trick of the week.

* * *

CLASSIFIED AD: Cat wanted for light mousework.

* * *

THE GREATEST STUMBLING BLOCK in the path of most men is not laziness or fear but a tight-skirted, low-necked, sultry-voiced, diamond-decked, perfume-scented temptress called "Tomorrow".

* * *

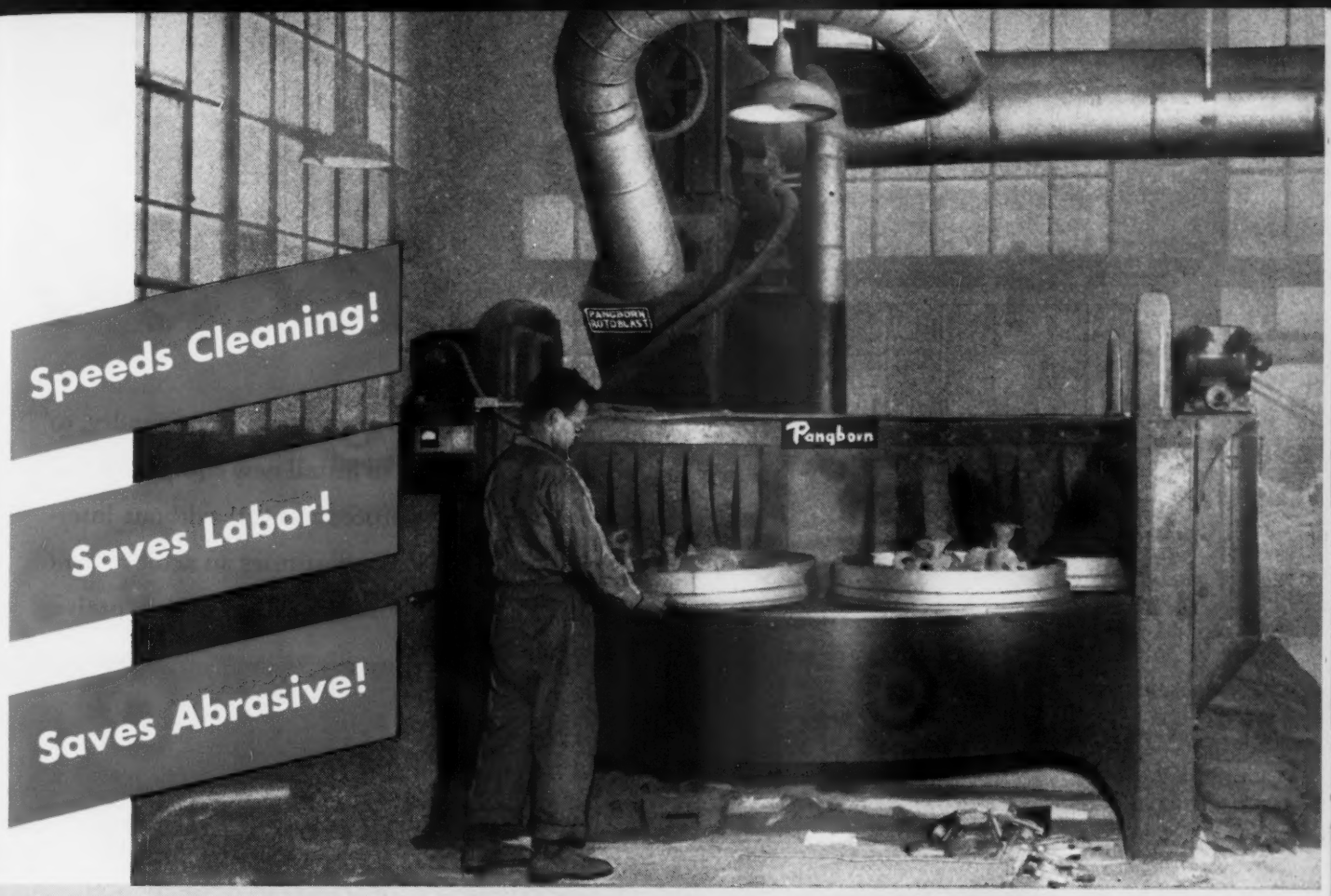
TOMORROW IS TOO LATE in so many cases. Today is now and there's no time like the present. This applies to many things—including that long put-off letter or phone call to Pangborn or to your nearest district office. Why tolerate high labor costs and production bottlenecks in the cleaning room for even one more day? The solution is as near as your mail box or telephone. For a profitable tomorrow, look into that Pangborn machine today.

* * *

IN CASE YOU ARE INTERESTED, we light an average of 6,000,000 matches per minute in these United States.

* * *

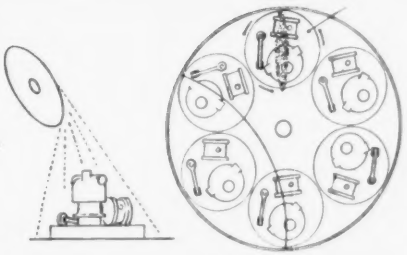
MEN WOULDN'T MIND WOMEN having the last word if they didn't keep repeating it over and over.



Read how this Pangborn "LG" ROTOBLAST* Table CUTS CLEANING COSTS by $5556.00 A YEAR

PROFITABLE BLAST CLEANING! That's the story at the Anstice Co. in Rochester, N. Y. Their Pangborn "LG" ROTOBLAST Table shown above has cut labor costs by $2540.00 a year—even though tonnage has increased! In addition, abrasive costs have been cut by $3016.00 a year because ROTOBLAST makes full use of long-lasting Malleabrasive grit (it can be used for up to 300 passes!) As Ken Proud, Foundry Manager sums it up: "We are more than satisfied with results!"

You'll be more than satisfied with



Pangborn "LG" ROTOBLAST Tables too because they're designed for fast, low-cost cleaning of intricate and fragile work. As shown above they clean *completely* because abrasive is hurled at a 45° angle to the work. And *uniform* cleaning is assured because auxiliary tables revolve castings under blast stream.

No matter what you clean, Pangborn has a standard ROTOBLAST Table designed for your job. Included in the standard line are *Turn-Style* Tables for bulky castings . . . and *Table-Rooms* for jobbing work. For full information on the right Pangborn ROTOBLAST Table for your job, write to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

ROTOBLAST . . .

- SAVES LABOR with push-button operation
- SAVES SPACE because machines are compact
- SAVES TIME by cleaning more loads per day
- SAVES POWER since no compressor is needed
- SAVES TOOLS because all scale is removed

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment.

Pangborn

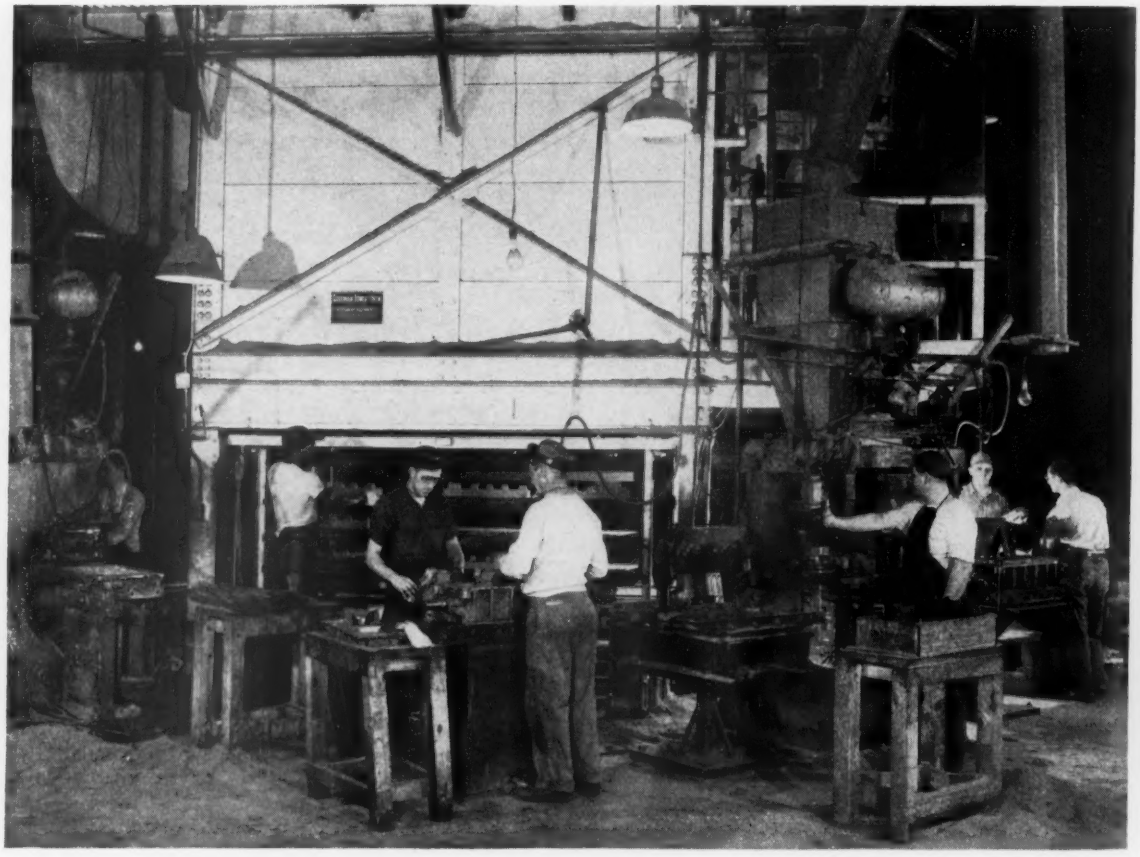
BLAST CLEANS CHEAPER

with the right equipment for every job

*Trademark of Pangborn Corporation

a Salute to

To double the productive capacity of its gray iron foundry, to devise new production methods, to install new equipment and to train operators in the new procedures, all without interruption of the current operations, constitutes an achievement for which the Studebaker Corporation deserves high praise.

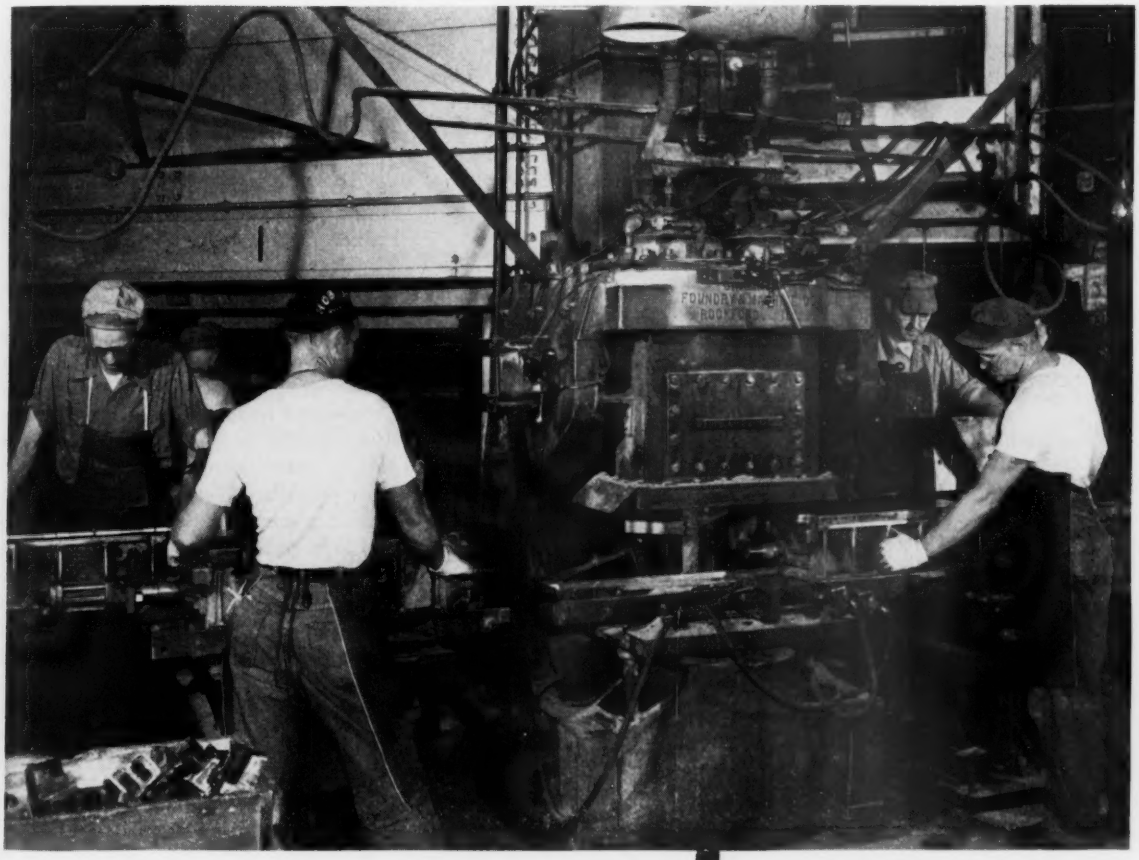


Above is shown one of the four identical core producing units, each consisting of two Champion CB-18 core blowers, serving one vertical core oven.

Opposite is a close-up of one of the Champion CB-18s in each of the four units. The eight CB-18s are the latest addition to the large battery of Champion core blowers already in service at the Studebaker foundry. The arrangement of the accessory equipment minimizes the lost time at the core blowers.

Studebaker

Champion Foundry & Machine Company is proud to have had a part in this expansion program, the results of which prove that, no matter how efficient a foundry may appear to be, it pays to study the possibilities for improvement in the adoption of modern equipment and methods.



Champion

FOUNDRY AND MACHINE CO.

GENERAL OFFICE AND PLANT ROCKFORD, ILLINOIS
SALES OFFICE, 1553 W. MADISON ST., CHICAGO 7, ILL.

OLDING MACHINES CORE BLOWERS THE ELECTRIC RIDDLE

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ENGINEERED BELTING CUTS COSTS 50%

■Ten years ago an Eastern foundry tried and discarded four different types of conveyor belting. Extremely hot core sand made replacements frequent and expensive. An Imperial Belting engineer analyzed the operating conditions and recommended Imperial's INSULATED SAHARA, a belting manufactured especially for carrying hot, abrasive materials. Insulated SAHARA outlasted all belts previously tried by **2 to 1.** Since 1939 no other brand of belting has been used.

Unexcelled for Hot Materials

Made of 37½ ounce tight woven duck combined with asbestos and special insulating material and then impregnated. Insulated Sahara handles materials from 300° F. to 450° F.; Super-Insulated Sahara, from 450° F. to 600° F. Imperial's double-stitched, Inner-Locked construction positively prevents ply separation.

Write for Data Sheet 47-8 and prices.

IMPERIAL BELTING CO.

1755 S. Kilbourn Ave., Chicago 23, Ill.

Imperial
INNER-LOCKED
BELTING
Engineered Belting—
The Right Belt for Each Job

With the EDITORS

EACH YEAR the number of meetings scheduled by the multiplicity of organized groups within the foundry and related industries appears to increase. Because the majority of these meetings are well organized and provide discussions designed to improve product, process or profits, men of the industry spend considerable time attending. Speakers, in many instances, are requested to appear before a number of groups, so that their life resembles that of the talent on the old Chautauqua circuits.

Even the editors find the task of attending the meetings and reporting activities something like a merry-go-round ride, especially in the spring and fall seasons. A check of editorial travel from the middle of September through the first week in November gives some idea of what an editor does in his spare time.

Bill Gude attended the first fall meeting of the Society of Business Magazine Editors in Washington, and spent some extra time calling on government agencies concerned with the foundry field. He reported the industry meeting of the Malleable Founders' Society, Cleveland, flew out to Houston for the Texas Regional Foundry Conference, and attended the Purdue Regional Conference.

Ed Bremer covered the Michigan Regional Foundry Conference at Michigan State College, East Lansing, picked up an article at Grand Rapids, which will be published shortly, and spent several days at the National Metal Exposition and Congress.

Erle Ross of Chicago attended the Regional Conferences at Purdue and Iowa and helped cover the Gray Iron Founders' Society annual meeting.

Pat Dwyer was on the program of the New England Regional Conference at Boston.

Bob Herrmann visited Michigan for a article to be published soon.

The editor spent one day at the fall meeting of the Steel Founders' Society at Hot Springs, attended the Pangborn open house at Hagerstown, spoke before the Tennessee Chapter of AFS at Chattanooga, tramped the scattered exhibits of the National Metal Exposition at the Detroit Fair Grounds, attended the annual meetings of the Gray Iron Founders' Society in Chicago, and the Foundry Equipment Manufacturers' Association at the Homestead, participated in a New York meeting of business magazine editors called by NPA to help further the scrap drive, and spent a week making calls in the East.

—o—

Equipment and supply representatives in New England always throw a big dinner and party at the Parker House, Boston, on Saturday evening following the close of the regional conference. On numerous occasions various editors have been present and we can vouch that it is quite an affair. This year Pat Dwyer was surprised when the boys produced a birthday cake with one candle, announced it was his birthday, and sang, "Happy Birthday to You" with considerable gusto and volume. Of course, it was not Pat's birthday, but he enjoyed the stunt immensely, and so did the old friends at the party.

—o—

Pangborn invited a number of editors to the open house, reported in the November issue, including the editor of FOUNDRY, *Steel,* and *New Equipment Digest* of the Penton family. In the morning we enjoyed a special visit with Thomas W. Pangborn, president of the organization, and at noon some of us were guests of Lloyd Stouffer, company secretary, at Rotary. In the afternoon, all editors were conducted through the plant, and in the evening they were entertained at dinner at the country club. Victor F. Stine, vice president, was toastmaster; and Preston Lane, former governor of Maryland, was the principal speaker.

—o—

Every place the editors go, they find friends who read FOUNDRY. For example, Erle Ross, Chicago editor, spent his vacation in the northwest section of the country, and at Lead, S. Dak., took a 60-minute visitors' tour through the surface operations of the Homestake Mining Co., which produces gold. Erle reports that the young lady guide mentioned the company's foundry, and later took the group to it. She was not able to tell him in advance what metals were cast, but knew that they had cupolas. Before entering the foundry she explained in a nutshell how molds were made and poured. Erle doesn't believe

(*Concluded on page* 12)

An Open Letter to the Aluminum Foundries *from the* U. S. REDUCTION CO.

WE NEED YOUR HELP!

At the time this message was prepared – early September – aluminum scrap had become extremely scarce. We hope sincerely that by now the normal flow of scrap has resumed.

You can help the aluminum smelters as well as yourselves by doing everything in your power to see that scrap gets back to them through normal channels. Talk to your friends and customers who generate scrap in their operations and urge them to return this desperately needed scrap – all types and grades – large or small quantities – to the smelters through their regular scrap dealers.

Without scrap the smelters must continue to curtail their much needed production and you will not get the aluminum alloys you need in the quantities necessary to produce the castings required in the defense effort by your customers.

WON'T YOU HELP THE ALUMINUM SMELTERS – THE DEFENSE PROGRAM – AND YOURSELF?

For 47 years, pioneers in aluminum development.

USCO

U. S. REDUCTION CO.
East Chicago, Indiana

PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO

He has a grinding problem well in hand

How to get grinding wheels exactly suited to his **jobs!** That's his problem, and he's looking in the best place for the right answer . . . Simonds Abrasive Company's Grinding Wheel data book. It describes Simonds complete line and lists everything *you* need for top grinding efficiency . . . grinding wheels of all sizes, mounted wheels and points, segments and abrasive grain . . . accurately specified and made by Simonds Abrasive Company, a major manufacturer of grinding wheels for almost 60 years. Write for data book and name of your distributor.

SIMONDS ABRASIVE CO.

Grinding Wheels

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

(*Concluded from page* 10)

he ever heard such a complete explanation in so few words, and despite the brevity, the description was on the beam. Metal was not being poured, but as Erle left the plant he spotted a small office door with a gentleman inside. He stuck his head through the door and asked how many cupolas. He then introduced himself as the Chicago editor of FOUNDRY. The gentleman beamed and immediately offered his hand, explaining that he was C. M. Parsons, with the title of superintendent or general foreman, either title being satisfactory. He next pulled out a copy of the September FOUNDRY and stated that he got it regularly. Mr. Parsons reported that Ralph Lee, FOUNDRY columnist, went through on one of the visits a couple of weeks previously but unfortunately he was not on hand and regretted missing the visit very much. Thanks so much to Mr. Parsons for his cordial greeting to Erle Ross, and thanks to the thousands of other readers who treat us so kindly when we meet them all over the country.

—o—

According to Bill Gude, the Shamrock, Houston's beautiful hotel and site of the recent Texas Regional Foundry Conference, plays host to a broad cross section of business because of the many sectional and national meetings it attracts. Conventions of morticians and wholesale druggists preceded the gathering of foundrymen, who moved out in time to make way for 1200 independent oil producers. Harry Dietert says the Shamrock site was a mosquito-infested swamp when he taught at nearby Rice Institute more than 25 years ago. Incidentally, Rice now has a football stadium seating 70,000—which should be adequate for its 1500 students.

—o—

During the fall meeting of the Steel Founders' Society at the Homestead, Kermit Donaldson, executive vice president, said some very kind things about the editor, as reported last month by Guest Editor Earl Shaner. The citation really is a tribute to the vision of the Penton management, which recognizes the responsibility of an editor to serve his field and is willing to devote time and money to make possible that service. It also is a tribute to the staff of editors who do such a wonderful job each month in assembling the editorial material and preparing it for publication. Realizing the tremendous contributions of others, it is with deep humility that the editor expresses appreciation to the Steel Founders' Society and Kermit Donaldson.

F.G.S

COMPLETE SAND HANDLING SYSTEMS

planned
designed
fabricated
installed
serviced

BY
NEWAYGO
ENGINEERING CO.

A complete sand handling system. Shakeout sand elevator, overhead storage, and mullers in background. Conditioned sand is delivered to overhead molding hoppers. Completed molds are set out on gravity conveyors for pouring from overhead monorail cranes. System handles 60 tons of sand per hour.

This unit is the heart of a sand handling system. Elevator carries shakeout sand to screen and bin conditioning unit. Sand passes into muller in batches as required. Prepared sand is delivered by conveyor to molding hoppers. This unit is designed for large or small systems.

are you planning a new or improved

Here are 4 important reasons why the NeWay plan is the right way and profitable way to modern, efficient, low-cost sand handling:

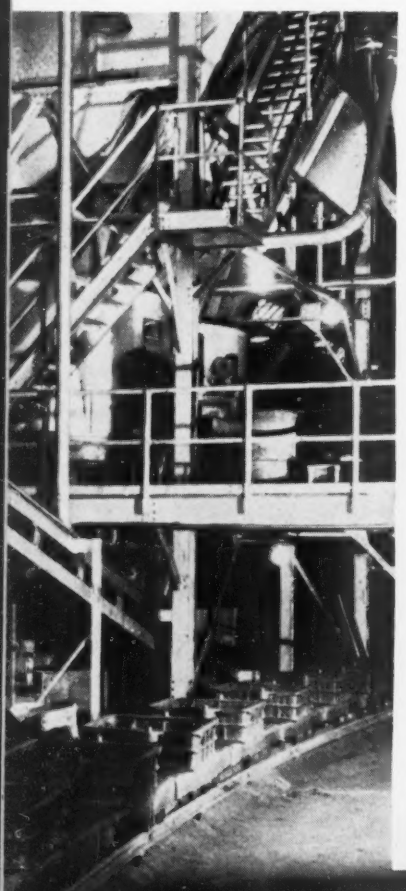
- *Free engineering* layouts, service and estimates *by practical engineers.*
- Single contract efficiency with one company responsible for fabrication, installation and erection.
- A complete staff of *service engineers* on 24 hour call.
- A 40-year record of proven ability.

NEWAYGO, MICHIGAN

ALSO MANUFACTURERS OF: The revolutionary new *Handy Sandy* and *Reddy Sandy*, complete package units for smaller installations. Write for literature.

SIMPSON *Intensive* MIX-MULLERS HELP *Studebaker* DOUBLE THEIR FOUNDRY PRODUCTION...

NATIONAL ENGINEERING COMPANY is especially proud of their part in furnishing TWELVE Simpson Intensive Mix-Mullers and other sand handling equipment for Studebaker's latest modernization program.



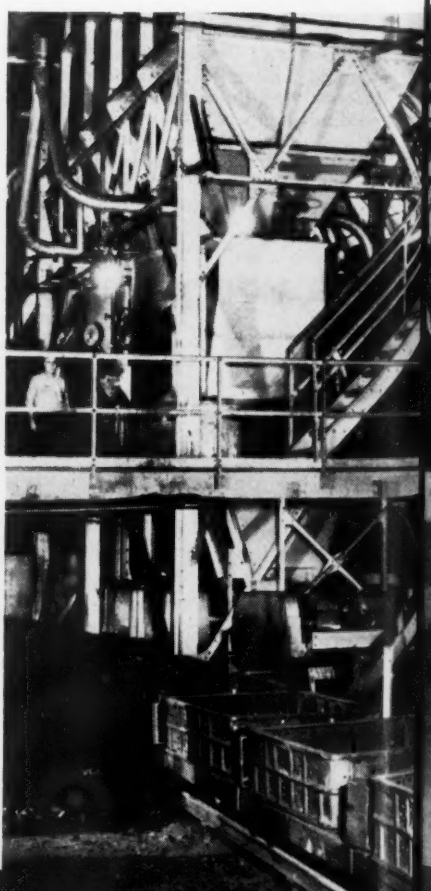
Consider these impressive results and you'll see why:

Casting production stepped up 100%, with no loss of working time—Working conditions materially improved and previous bottlenecks eliminated—Reduction in man-hours per ton—Plant efficiency and handling operations further mechanized and simplified—all of which add up to a new high standard of foundry operation in this famous South Bend plant.

In your own foundry, as at Studebaker, the quality *and* quantity of finished castings is largely dependent upon the correct, controlled preparation of your sand. You may not need the big tonnage output of 12 Simpson Intensive Mix-Mullers . . . but whatever your requirements, there is a Simpson model which will assure top production and top quality that your finished product must have.

Write for Bulletin 511 on the new 2F and 3F Simpson Mix-Mullers . . . or Bulletin 507 which describes the Simpson "Utility" unit for mechanizing smaller foundries.

Shown at the left and right are two groups of two No. 3 Simpson Intensive Mix-Mullers fed by overhead hoppers in Studebaker's molding sand operation.

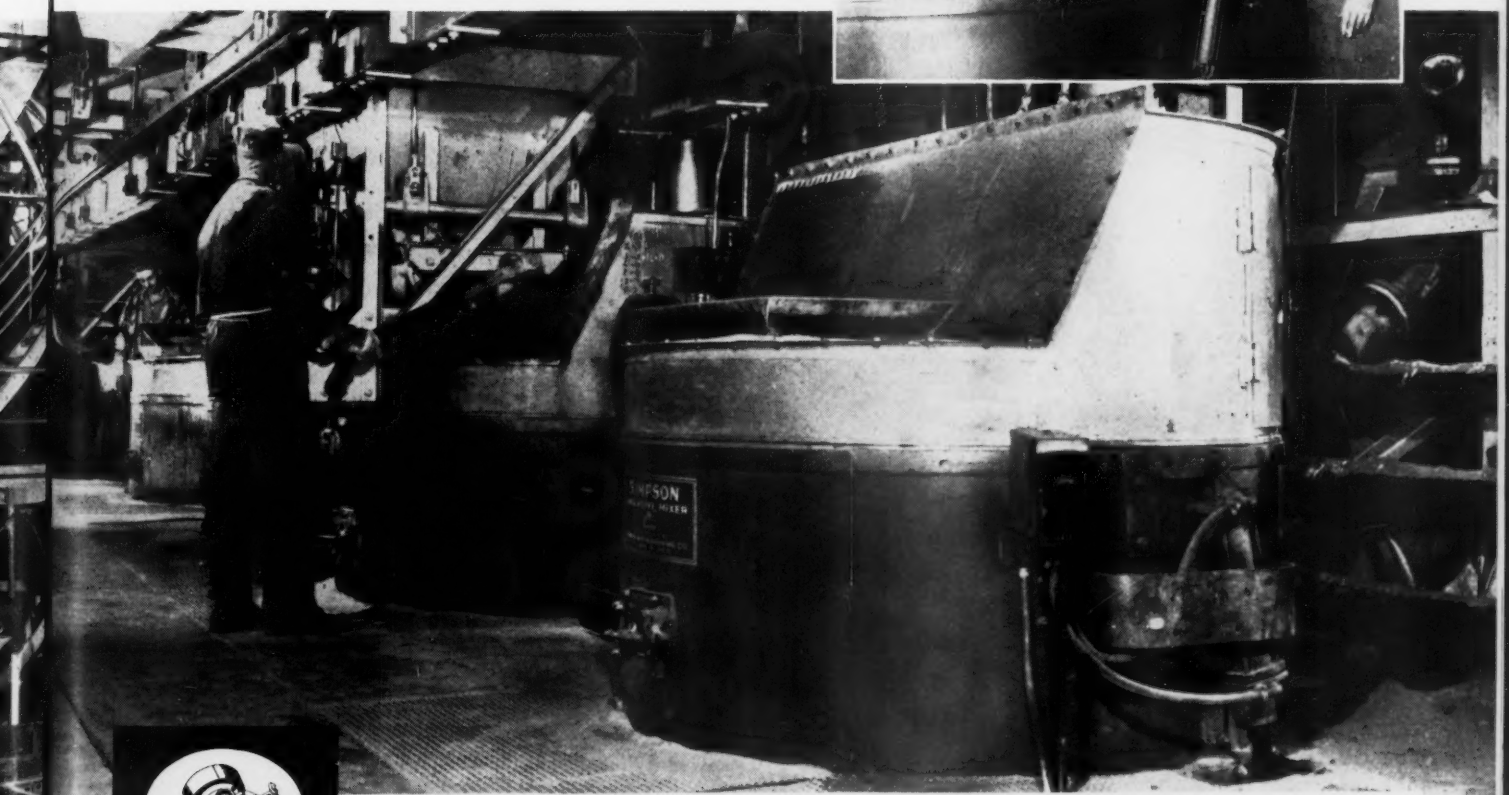


12 SIMPSONS provide quality core and molding sand for modernized South Bend gray iron foundry

TOP: Two more of the six No. 3 Simpsons used for properly conditioning molding sand at the South Bend foundry.

CENTER: Another view of one of the Simpson Intensive Mix-Mullers which has helped Studebaker to double their foundry capacity.

BELOW: View showing five of the six No. 2 Simpsons in the Studebaker foundry, used for core sand preparation. Note motor operated, traveling weigh larries, which gather and weigh sand, clay and seacoal.



SIMPSON *Intensive* MIX-MULLERS

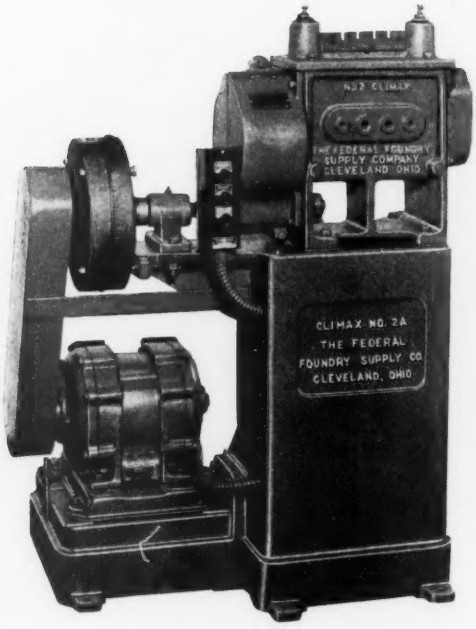
NATIONAL *Engineering Company*

608 Machinery Hall Bldg. • Chicago 6, Illinois

Manufacturers and Selling Agents: For Continental European Countries—George Fischer, Ltd., Schaffhausen, Switzerland; for British Possessions—August's Limited, Halifax, England; for Canada—Dominion Engineering Co., Ltd., Montreal; for Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd., Sydney; for Argentina, Brazil and Uruguay E quipamentos Industriais EISA Ltda., Sao Paulo, Brazil; for Mexico—CASCO S. De R.L., Mexico, D.F.

IT'S NO TRICK

Use efficient equi

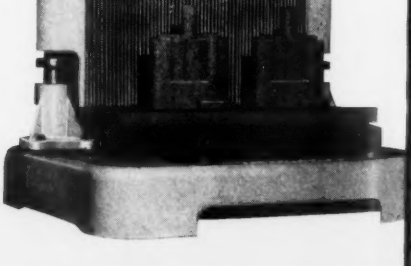


Model 2
Motorize

. . . don't waste wire—reclaim it!

With wire hard to get, it's smart to reclaim used wires and rods. And economical, too! The Climax Wire Straightener, a favorite with foundrymen for 40 years, is easy and safe to operate. A wide variety of models—choice of drives and wire sizes, from 1/16" to 3/4".

Bench Model



FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

...ment to cut production costs

Model No. 600
7.5 h.p.

...mix well to save on binders!

The Whirlmix, with flexible steel rubbing arms that mix thoroughly without heating, let's you cut down on binders and still get maximum bond. Fast, economical operation, too. Four models:

SAND MIXTURE	BATCH SIZE				MIX TIME
	Lab Model 0.5 h. p.	No. 100 2 h. p.	No. 300 5 h. p.	No. 600 7.5 h. p.	All Models
Core Oil Sand	15 lbs.	100 lbs.	300 lbs.	600 lbs.	3 minutes
Facing Sand	10 lbs.	60 lbs.	200 lbs.	400 lbs.	1½ minutes
Dry Core Comp.	10 lbs.	60 lbs.	200 lbs.	400 lbs.	1½ minutes

...apprentices draw perfect cores!

Ra-Draw—the ideal core drawing machine apprentice or experienced core makers. eration is easy and fast. Simply place core against vibrating head and lift box. Machined oves in drawhead insure accurate draws. de in bench and floor models.

...green sand cores, made with molding sand, cut costs!

Federal's new San-Blo has revolutionized core blowing. Heavy sand mixtures, complicated and large cores always rammed before, are now blown easily and quickly. Core production is multiplied and costs slashed!

De Luxe Model CB-40-D

Pitch, cereal, synthetic resins, dry compound, oil and facing sands are blown successfully, regardless of green strength or moisture content. De Luxe Model features automatic drawing. Bench, Floor and De Luxe Models blow cores weighing up to 40 lbs. each, using standard blow head, blow plate and vent plate.

All models also available with electronic controls for timing the blowing cycle, and automatic refilling of blow head.

FEDERAL

DETROIT
CHICAGO
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THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 EAST 71st STREET • CLEVELAND 5, OHIO

Valve castings by Walworth Company, South Boston, Mass. Casting at left is from a "C" Process shell mold. Note smooth surface compared with conventional casting at right.

COSTS SKID ON SMOOTH CASTINGS

Casting 2-inch valve bodies like the one above at left with thin-shell sand molds made by the Croning Process – saves Walworth Company at least 5 per cent in the amount of metal poured.

Bonded with BAKELITE Phenolic Resins, thin shell molds and cores for ferrous and non-ferrous casting bring other important savings compared with the use of conventional green sand molds. Almost pattern smooth castings, with tolerances as close as .003 to .004 inches per inch, cut down finishing time. And since the molds permit venting of gases more thoroughly during pouring, rejects are reduced to a minimum.

Other advantages:

- Molds and cores can be baked in 30 seconds to two minutes – in quantity with uniform quality.
- Built-in dowel pins and holes assure accurate registration of mold parts.
- Dimensionally stable, moisture-resistant molds and cores can be stored for long periods.
- Light weight, less handling fatigue.

To learn more about how thin shell molds and cores cut foundry costs, improve quality and speed output, fill out and mail the coupon today.

Dept. DD-29, BAKELITE COMPANY,
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

Please mail at once my free copy of the booklet "BAKELITE Phenolic Resins for Foundry Molds and Cores."

Name_____ Title_____

Company_____

Street_____

City_____ State_____

BAKELITE
TRADE-MARK
PHENOLIC BONDING RESINS

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

NOW YOU CAN DO JOBS LIKE THIS

IN 10 MINUTES

WITH

VIRGO® MOLTEN CLEANER

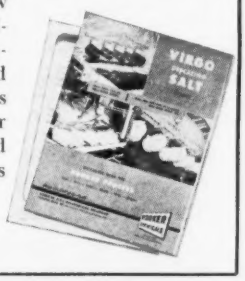
FOR FAST, SAFE, LOW-COST DESCALING —VIRGO® DESCALING SALT

Producers and fabricators of stainless and alloy steels use Virgo Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing.

The Hooker Process is backed by 15 years' experience in molten salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS

Get the whole story on Virgo Molten Cleaner and Virgo Descaling Salt—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process. Send for these bulletins today.



NEW, FAST *DESANDING, DEGRAPHITIZING* PROCESS

Saves You Up to 300 Hours per Month!

You can desand and degraphitize iron and steel castings in 10 minutes—or less—with Virgo Molten Cleaner.

Here's what you get: a *chemically clean* metal surface. No pitting or etching. No effect on dimensional stability. Any surface defect in a casting shows up clearly.

Here's how it works: a molten salt bath dissolves sand and graphite from every nook and cranny of the most intricate casting. A water quench, a dip in dilute acid, and a brief hosing with water complete the job.

You can use Virgo Molten Cleaner for stress relieving, too. Grey iron, carbon steels and some alloy steels can be stress relieved *while desanding*—in much less time than is required in a furnace.

This fast, safe process is easily adapted to your production methods. For full details, mail the coupon or write us today.

Hooker Electrochemical Company
20 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

Please send me Bulletins checked: Virgo Descaling Salt ☐ Virgo Molten Cleaner ☐

NAME_____

TITLE_____

ADDRESS_____

COMPANY_____

CITY_____ ZONE____ STATE_____

HOOKER CHEMICALS ®

From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY
20 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
NEW YORK, N. Y.
WILMINGTON, CALIF.
TACOMA, WASH.

1-1465

Here's "on the job" proof of furnace savings with

B&W ALLMUL FIREBRICK

BILLET HEATING FURNACE

"ALLMUL cost half as much!"

A builder of billet heating furnaces used an expensive electrically-fused mullite refractory in the piers and baffles as well as for the arches in the discharge end of the flue. Reason? Severe operating conditions at these points. Tests of B&W Allmul proved it withstood high temperatures equally well . . . cost approximately half as much. Result? Allmul is now standard for these locations.

BUTT WELDING FURNACE

"39 weeks instead of 6 weeks!"

Semi-mullite brick bungs in the hottest part of a butt welding furnace spalled badly after six weeks. Allmul bungs in the same location were still going strong after *39 weeks*—in better condition than the semi-mullite bungs after six weeks. *Yet Allmul cost little more than the original semi-mullite refractory.* Allmul is now used in uptake arches, uptake side walls and crossovers. Customer has ordered 30 carloads to date.

CUPOLA FRONT-SLAGGER

"ALLMUL has 6 times the life plus . . ."

Replacing super-duty firebrick in a cupola front-slagger of a malleable duplexing operation three times a week was an expensive chore. B&W Allmul in the same location lasts approximately two weeks . . . *six times as long.* Costs drop, too, because of savings due to less frequent relining.

What's behind the remarkable, money-saving performance of B&W Allmul Firebrick? The answer lies in its low first cost for a fused mullite brick and unique combination of excellent refractory properties: high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F. Bulletin R-29 gives all the facts on Allmul. Write for your copy.

BABCOCK & WILCOX

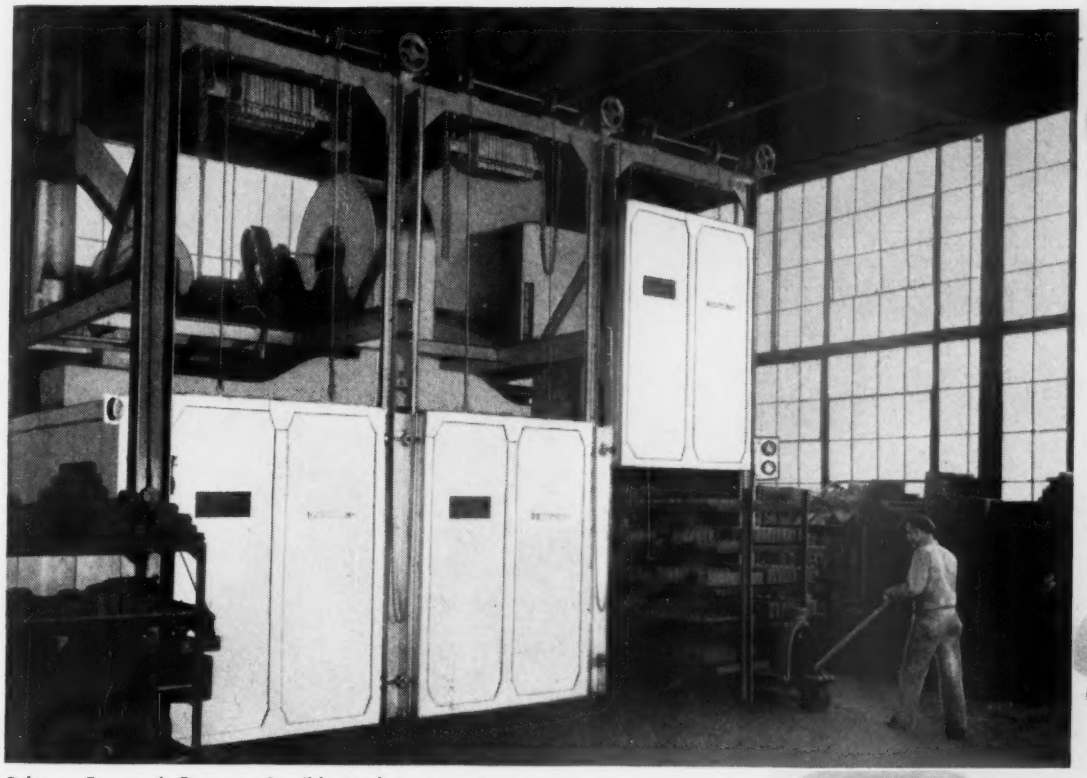
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

R-425

B&W REFRACTORIES PRODUCTS—B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

more production...less waste!

COLEMAN OVENS



Coleman Transrack Ovens at Crucible Steel Castings Co.

● Coleman Transrack Core Ovens enable you to produce more uniformly baked cores and obtain increased production of more, better quality castings. Perfect baking eliminates core and casting scrappage . . . saves valuable materials, time and manpower.

Coleman Transrack Core Ovens, for use with hand or power lift trucks, are particularly efficient where ample floor space is available. Dependable baking results in uniformly better cores . . . increases core production and lowers costs.

Coleman Ovens are built in all conventional types and sizes as well as specially engineered installations to meet every operating requirement. There is a type of Coleman Oven to help give you maximum production on every core baking or mold drying job. Write today for Bulletin 48.

Only COLEMAN OVENS offer all these advantages:

- **PERFECT DRYING AND BAKING** eliminate manpower and casting losses due to make-overs and rejects.
- **INCREASED PRODUCTION** by making the most efficient use of skilled and unskilled labor.
- **HEAVY DUTY-CONSTRUCTION.** Responsible for dependable performance, economical operation, and minimum maintenance cost.
- **GREATEST SAVINGS IN FUEL** by using the most economical fuel available.
- **MOST ECONOMICAL CORE BINDERS** for your particular casting requirements, oil or resin, can be used.

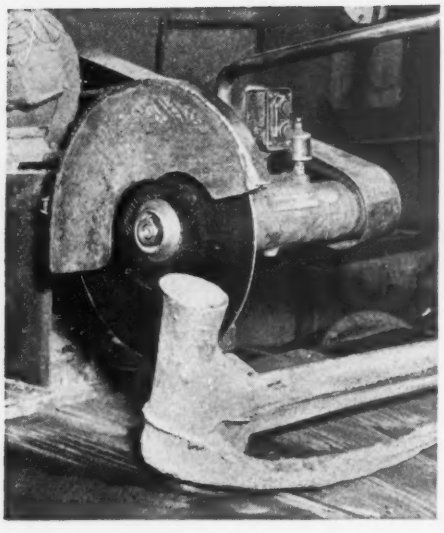
A COMPLETE RANGE OF TYPES: COLEMAN OVENS are built in a complete range of sizes and capacities for every core-baking and mold drying requirement: Tower Ovens, Horizontal Conveyor Ovens, Car-Type Ovens, Transrack Ovens, Rolling Drawer Ovens, Portable Core Ovens, Portable Mold Dryers, etc.

THE FOUNDRY EQUIPMENT COMPANY

1831 COLUMBUS ROAD — CLEVELAND 13, OHIO

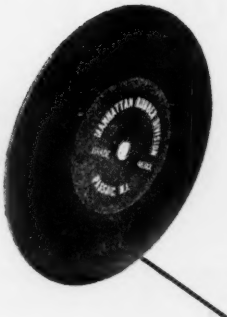
FEMA

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS



REINFORCED CUT-OFF WHEELS

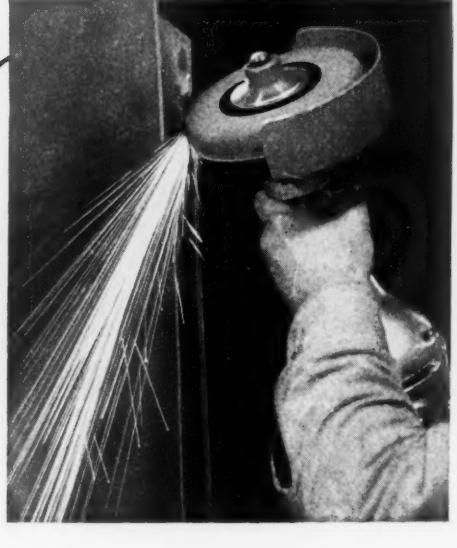
FASTER CUTTING
GREATER SAFETY



MANHATTAN ABRASIVE WHEELS

PORTABLE WHEELS

MORE METAL REMOVED
PER MAN-HOUR



The greatly increased strength of MANHATTAN Reinforced Foundry Cut-off Wheels enables them to withstand the severe strains imposed by foundry cutting.

With his greater confidence in the safety of these wheels, the operator works more vigorously instead of "babying" the wheel. This results in higher production and lower costs.

Manhattan Abrasive Wheels for portable grinders are engineered for the job. They satisfy workers on incentive pay who want high grinding speeds. They satisfy management men who want good quality production and lower costs.

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO ABRASIVE WHEEL DEPARTMENT

RM

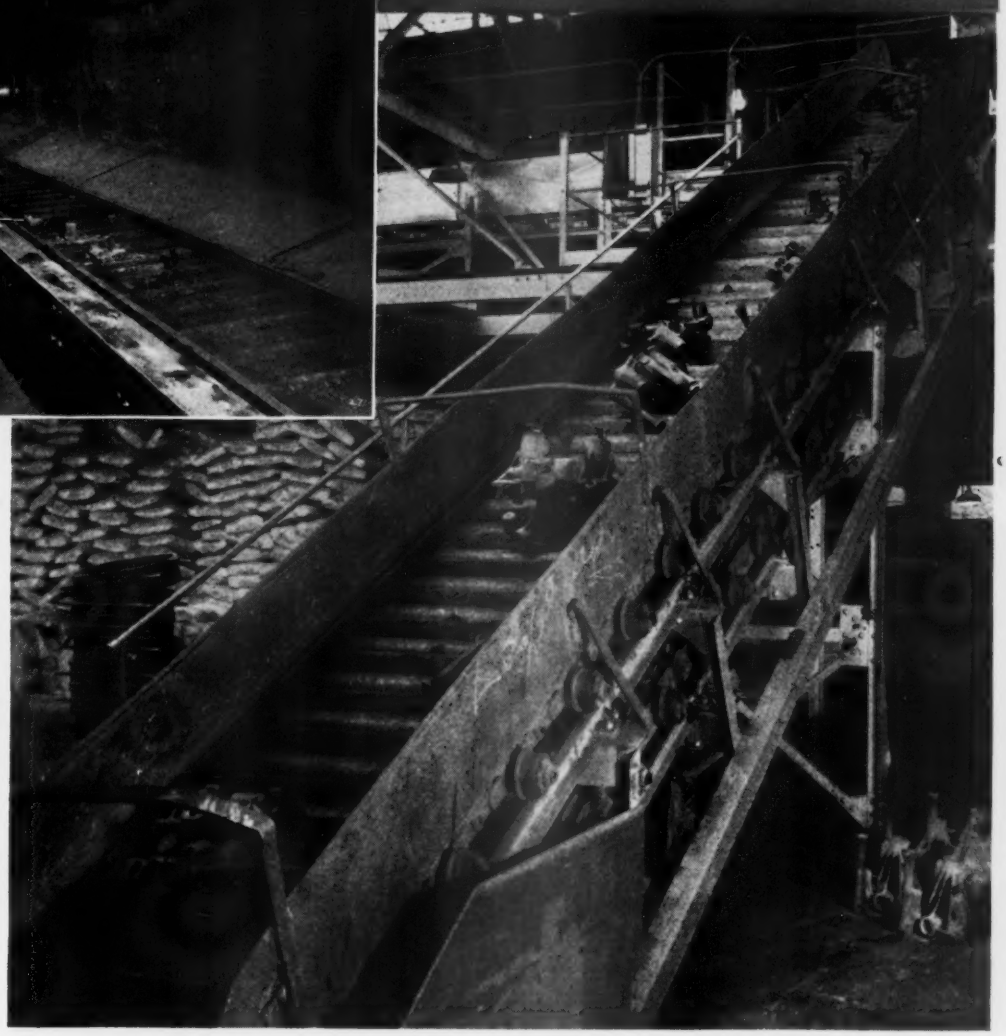
MANHATTAN RUBBER DIVISION

RAYBESTOS-MANHATTAN, INC.

PASSAIC, N. J.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

CASTINGS TAKE A RIDE...on the level and even *UPHILL*



Steel Apron Conveyors—leak-proof and bench high — are doing a real job in this modern foundry. They keep castings on the move in a way that spells increased production—lower costs. Accurately-formed double-beaded flights with ends arc-welded tight. Cleats are welded onto conveyor (at right) to prevent back flow when carrying up steep inclines.

- Clamshell Valves
- Bucket Elevators
- Belt Conveyors
- Core Crushers
- Disintegrators
- Electric Vibrating Feeders
- Pivoted Bucket Conveyors
- Flask Fillers
- Mold Conveyors
- Rotary Breaker Screens
- Sand Mixers
- Sand Aerators — Blenders
- Scraper Conveyors
- Transmission Mach'ry

IMPORTANT **Breakdowns in production lines are costly. Jeffrey Foundry Engineers are thoroughly familiar with the severe conditions encountered in the modern foundry. Service includes survey, followed by study and preparation of equipment layouts to suit varied requirements. They are specialists . . build for you, whether your foundry is large or small. Write us today.**

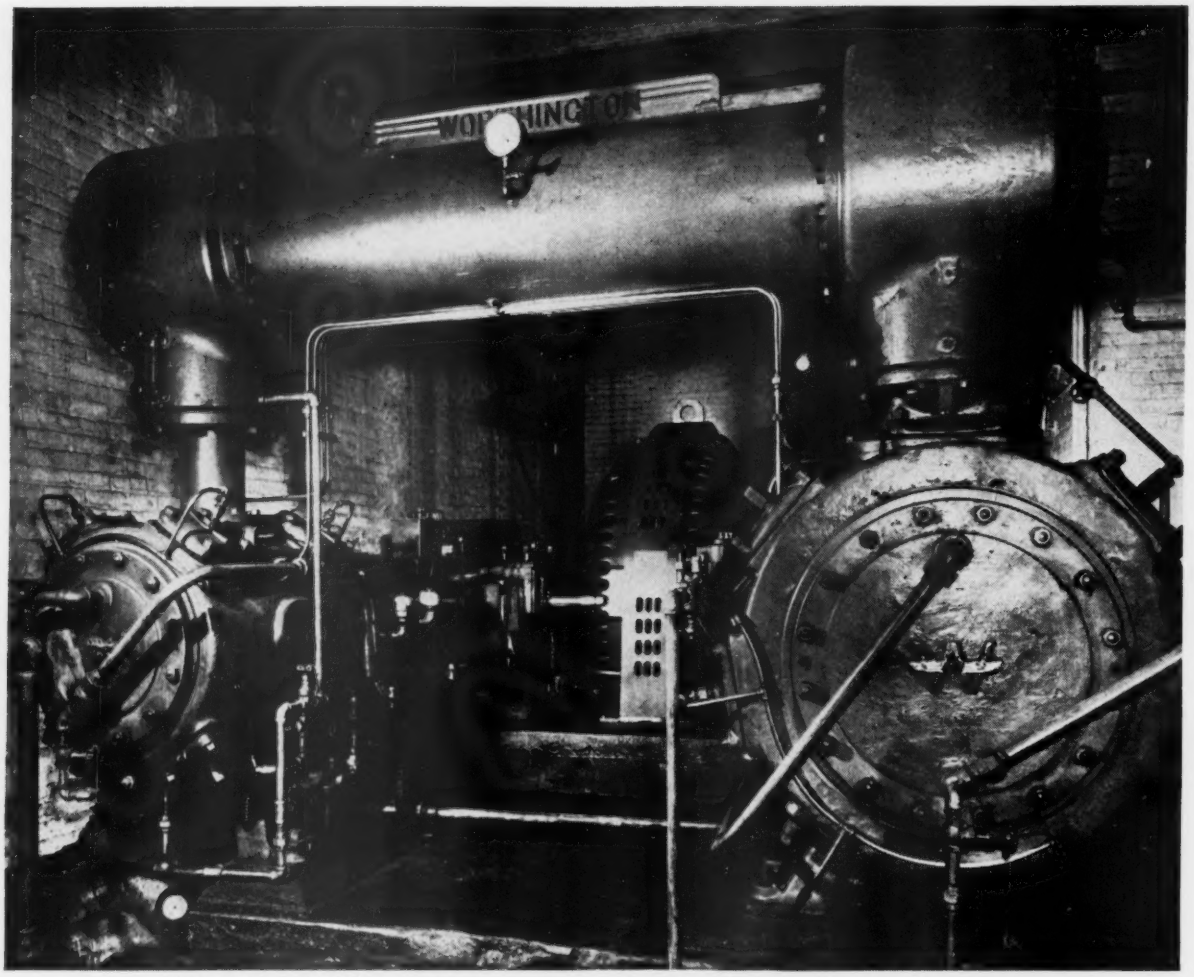
THE **JEFFREY** MANUFACTURING COMPANY ESTABLISHED 1877

907 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2 · Beckley, W. Va. · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 15 · Denver 2 · Detroit 13 · Forty Fort, Pa. · Harlan, Ky. · Houston 2 · Jacksonville 2 · Milwaukee 2 · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 1 · Salt Lake City 1

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio



Worthington DC-2 horizontal air compressor at Lynchburg Foundry Co., Lynchburg, Va.

It Saves Power Costs At Every Load

When Lynchburg Foundry Co. wanted additional compressed air capacity . . . more than its Worthington Y-type compressor could handle . . . a Worthington DC-2 was chosen.

With this duplex compressor, Lynchburg gets lowest-cost compressed air and longest compressor life.

LESS DEMAND ON MOTOR WHEN THERE'S LESS DEMAND FOR AIR

Five-step capacity control permits matching the pumping rate to the varying amounts of air required. This reduces power consumption at partial load.

Worthington's five-step capacity control governor is exceptionally sensitive because it performs *only pilot duty*. The actual unloading is done electrically and pneumatically. But the pumping rate is continuously under the *control* of the governor. With decrease or increase in demand, the governor causes the compressor to unload or reload in sequence.

Worthington's by-pass control also reduces operating temperatures, eliminating valve difficulties from carbon deposits, improving lubrication, and reducing cylinder wear.

Other features include Worthington's famous Feather* Valve (lightest, tightest, most efficient ever made) . . . and a high-efficiency intercooler which needs less water, less power, less attention.

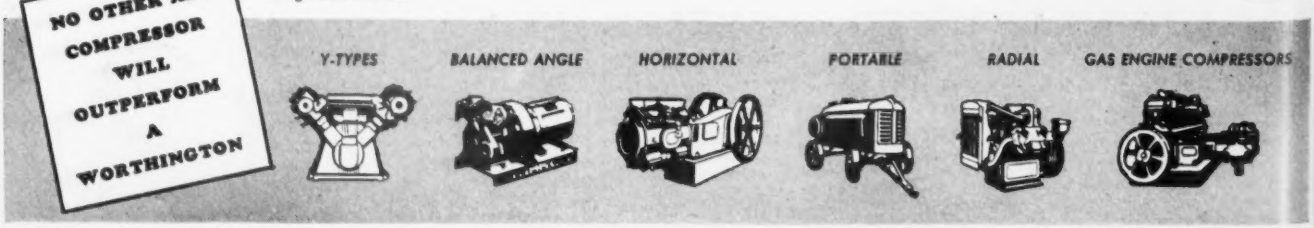
For more proof *there's more worth in Worthington*, write for Bulletin L-675-B1B to Worthington Pump and Machinery Corporation, Compressor Division, Buffalo 5, New York.

WORTHINGTON

NO OTHER AIR COMPRESSOR WILL OUTPERFORM A WORTHINGTON

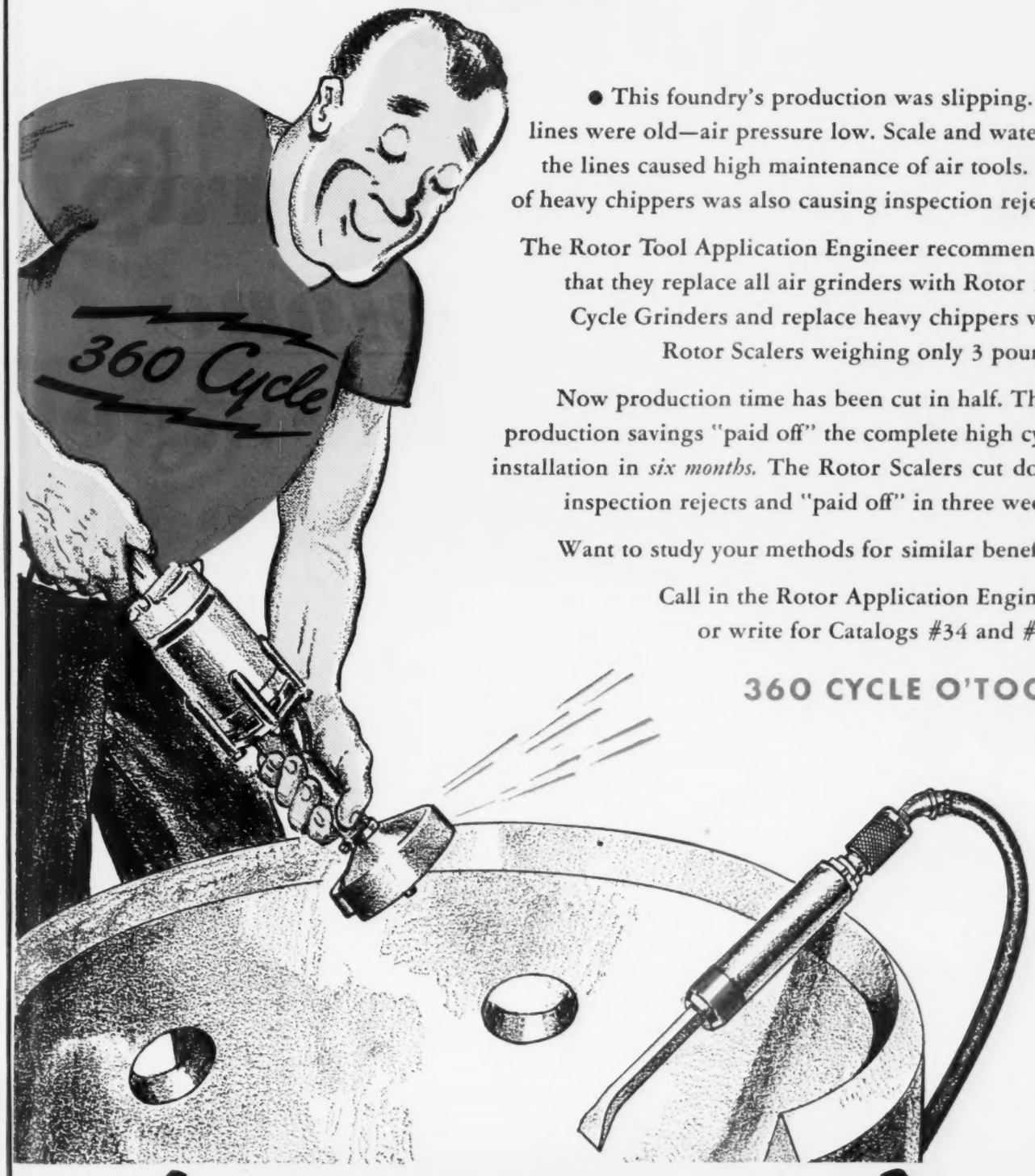
*Reg. U. S. Pat. Off.

K.1.6



CASTINGS CLEANED IN ½ THE TIME

ROTOR TOOLS "PAID OFF" IN 6 MONTHS!



● This foundry's production was slipping. Air lines were old—air pressure low. Scale and water in the lines caused high maintenance of air tools. Use of heavy chippers was also causing inspection rejects.

The Rotor Tool Application Engineer recommended that they replace all air grinders with Rotor 360 Cycle Grinders and replace heavy chippers with Rotor Scalers weighing only 3 pounds.

Now production time has been cut in half. These production savings "paid off" the complete high cycle installation in *six months.* The Rotor Scalers cut down inspection rejects and "paid off" in three weeks.

Want to study your methods for similar benefits?

Call in the Rotor Application Engineer or write for Catalogs #34 and #37.

360 CYCLE O'TOOL

THE ROTOR TOOL CO.
CLEVELAND, OHIO
UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

THIS IS **URGENT**

Production Scrap *alone* won't make the steel you need!

Read what Defense Mobilizer Charles E. Wilson says:*

"In order to achieve the tremendous goal of 110,000,000 tons of steel this year, 36,000,000 gross tons of iron and steel scrap must be channeled back to the steel mills and foundries. That is 6,500,000 tons above what was needed in 1950. *Normal scrap recovery sources cannot produce such amounts. Emergency sources must be discovered and activated."*

**In a letter to the editor of* PLANT ENGINEERING, *Aug. 10, 1951.*

ALL OF US MUST DIG DEEPER—*GET OUT THE HIDDEN SCRAP!*

Your plant could be one of the emergency sources Mr. Wilson is talking about. Appoint a scrap and salvage team. Study plant layout to determine what can be scrapped. Then turn it up and turn it over . . . to your scrap dealer for cash.

Check your plant for obsolete, broken, worn-out and irreparable:

☐ machinery ☐ dies ☐ jigs ☐ fixtures ☐ tanks ☐ boilers ☐ rails ☐ pipe and fittings
☐ motors ☐ machine bases ☐ tools ☐ chain ☐ structural steel ☐ valves ☐ starters
☐ transformers ☐ castings ☐ steel barrels ☐ nuts and bolts

Sell them to your scrap dealer NOW!

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

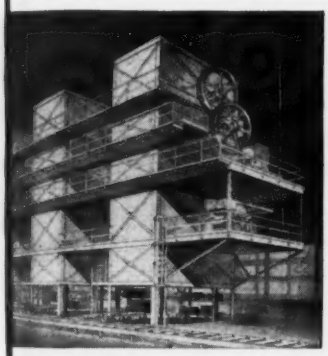
REPUBLIC STEEL

CONSIDER THE ADVANTAGES OF

CARL-MAYER *Engineering*

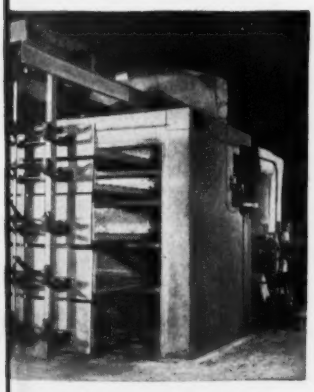
BEFORE PLACING ORDER *for* CORE *and* MOLD *Ovens*

Also OTHER TYPES OF INDUSTRIAL OVENS, AND FURNACES.



VERTICAL CORE OVENS
t General Steel Castings Co.

EXPERIENCES OF LEADING FOUNDRIES SHOW THAT CARL-MAYER ENGINEERING AND PATENTED FEATURES ENSURE AN IMMEDIATE SOLUTION OF CORE BAKING AND MOLD DRYING PROBLEMS WHETHER IT'S GREATER SPEED YOU WANT, QUALITY, FUEL ECONOMY—OR ALL.



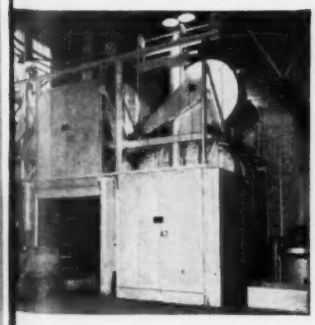
LLING DRAWER CORE OVEN
t Aluminum Co. of America

ASK CONCERNS LIKE THESE

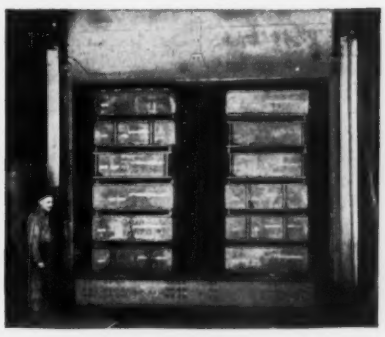
Approximately 90% of Carl-Mayer Oven installations are repeat orders.

WRITE FOR BULLETINS NO. 141 and 350.

- Aluminum Co. of America
- American Brake Shoe Co.
- American Radiator Co.
- Blaw-Knox Co.
- Brown Industries
- Buick Motor Div. of General Motors Corp.
- Bucyrus-Erie Co.
- Cadillac Motor Div. of General Motors Corp.
- Columbia Steel Corp. (U. S. Steel Corp.)
- Crucible Steel Castings Co.
- Dunkirk Radiator Co.
- Eclipse Aviation Division of Bendix Aviation Corp.
- Electric Autolite Co.
- Ford Motor Co.
- Fremont Foundry Co.
- General Electric Co.
- General Motors Corp. and Subsidiaries
- Gilbert & Barker Co.
- General Steel Castings Co.
- Golden Foundry Co., Inc.
- Henry Kaiser Corp.
- W. O. Larson Foundry Co.
- Mesta Machine Co.
- F. E. Meyers & Bro. Co.
- Oil Well Supply Co. (U. S. Steel Corp.)
- Packard Motor Car Co.
- H. B. Salter Co.
- Shenango Penn Mold Co.
- Standard Foundry Co.
- Union Brass & Metal Mfg. Co.
- Union Steel Castings Co.
- West Michigan Steel Castings Co.
- A. C. Williams Co.
- Whiten Machine Works
- Whiting Corp.



RACK TYPE CORE OVENS
Aluminum Co. of America



CAR TYPE MOLD OVEN
at Oil Well Supply Co.

HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co.

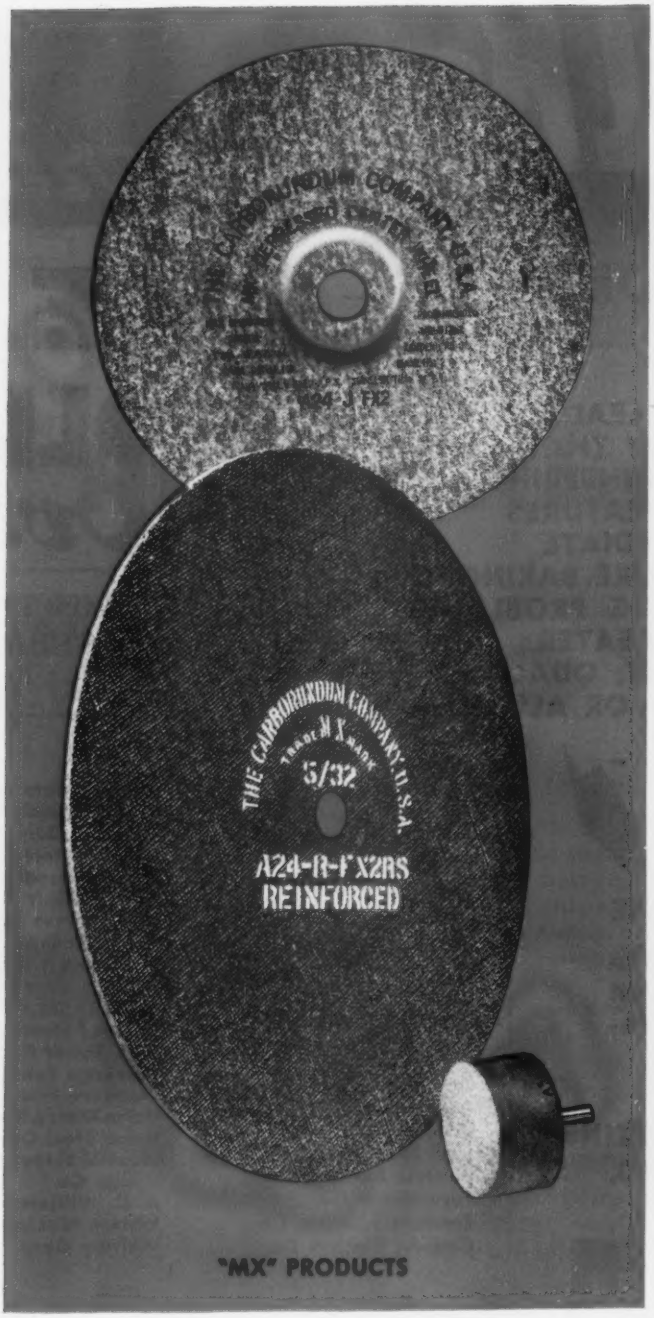
THE CARL-MAYER CORPORATION

3030 Euclid Avenue • Cleveland, Ohio

BACKED BY REPUTATION AND OVER 30 YEARS' EXPERIENCE

For Low-Cost High-Speed Portable Grinding

THE RIGHT

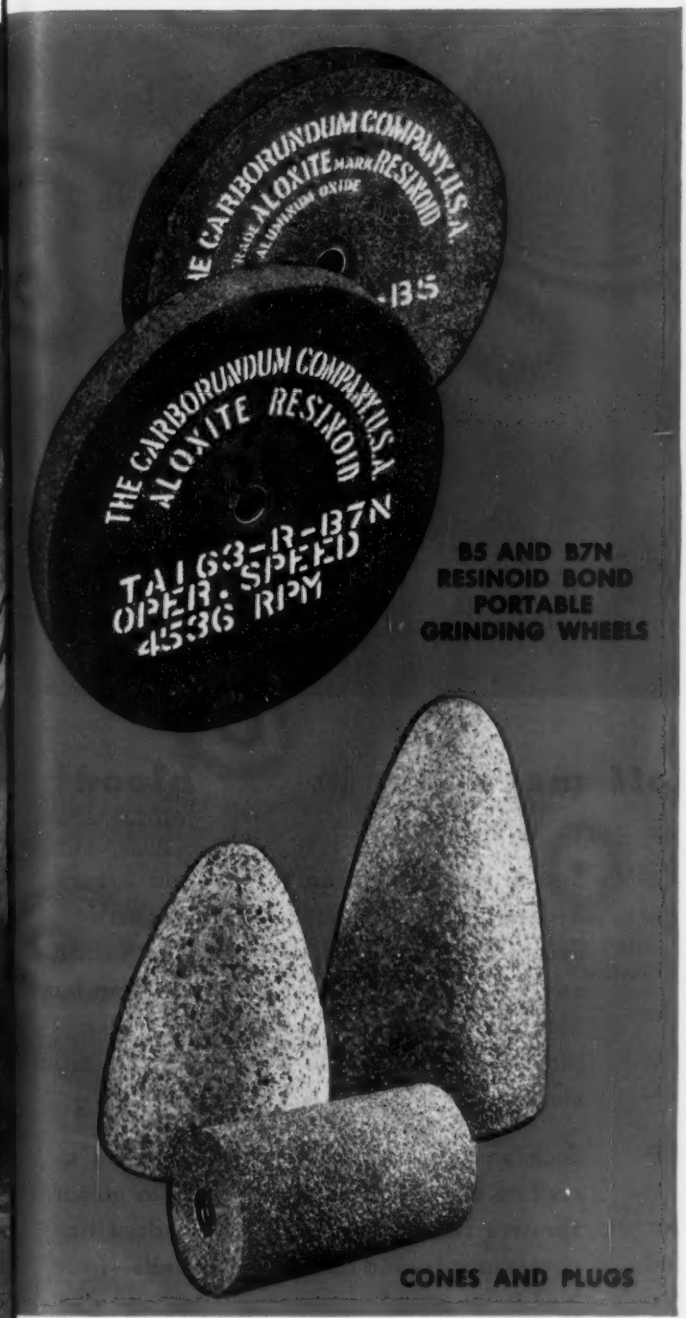


Only CARBO

TRAD

"Carborundum", "MX" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, New York.

ABRASIVE IS ESSENTIAL



With today's emphasis on high-speed grinding it is more important than ever to be sure of highest efficiency through proper selection of abrasives.

Only CARBORUNDUM makes a *complete* line of abrasives, from which selection can be made of the *right* one for the job. This *selectivity* of abrasives combines with product quality and experience in manufacture to give you a surer route to meeting high-production quotas efficiently.

B5 AND B7N RESINOID BOND PORTABLE GRINDING WHEELS with *built-in rubber bushing* are typical of high-efficiency products by CARBORUNDUM. These new wheels lessen operator fatigue by dampening vibration . . . increase production efficiency by reducing wheel "bounce." Proper mounting is assured through metal-to-metal contact provided by steel liner.

"MX" PRODUCTS include plain straight, depressed center and mounted wheels for portable grinders. They are ideally suited to high-speed operation in cut-off, slotting, edge breaking, deburring, weld grinding and surface finishing...and perform over this wide range of applications with maximum safety.

CONES AND PLUGS by CARBORUNDUM are produced in a wide range of shapes and sizes to maintain high production rates on hard-to-get-at surfaces.

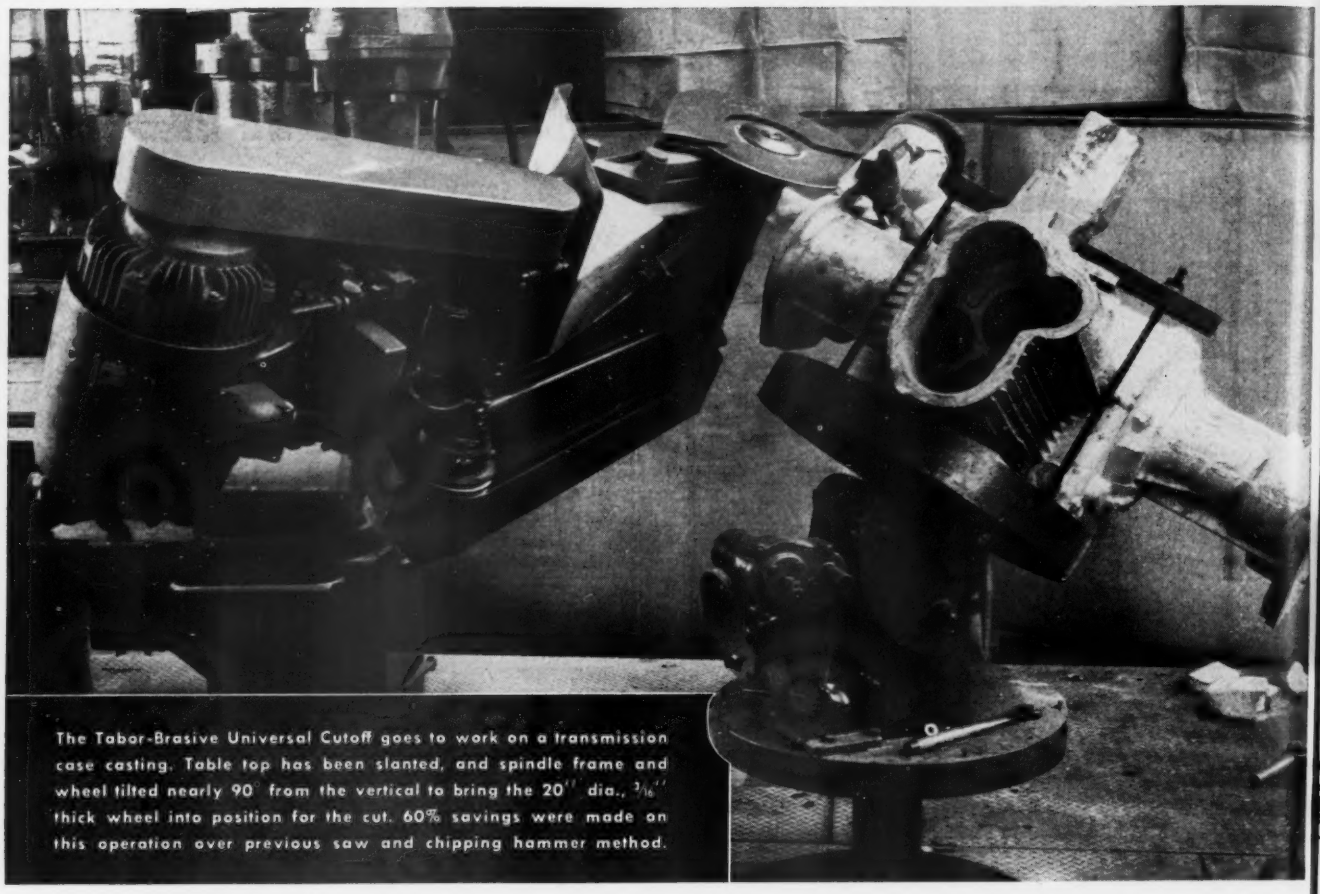
● Other abrasive products for high-speed as well as low-speed grinding are included in the *complete* CARBORUNDUM line. See your CARBORUNDUM representative, or write Dept. F 81-17.

RUNDUM

A D A R K

kes ALL Abrasive Products...to give you the proper ONE

81-17



The Tabor-Brasive Universal Cutoff goes to work on a transmission case casting. Table top has been slanted, and spindle frame and wheel tilted nearly 90° from the vertical to bring the 20" dia., 3/16" thick wheel into position for the cut. 60% savings were made on this operation over previous saw and chipping hammer method.

We have abrasive cutoff machines in our blood!

How else could our staff design and build the machine shown—a giant that does almost the impossible.

It cuts gates, fins, and risers at just about any angle, from almost any shape of casting, within a 220-square foot working floor area.

"Flexibility," you ask? The main column moves back and forth. The arm swings completely around the column. The spindle frame swings 270° around the end of the arm and rotates 90° either way from vertical. The cutting table handles castings weighing up to 500 pounds. Table unit raises and lowers hydraulically and rotates 360° on its vertical axis. Table top also rotates about its center and tilts 90°. As many as four tables can be incorporated in the unit. Except for the chopping or cutting action, all movements are electrically controlled and spring-locked.

Such an example of design skill serves to reaffirm that Tabor is a good place to go for abrasive cutoff machines. Our standard line covers foundry and metalworking units—from 3 H.P. on up. Complete bulletins and data for the asking.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

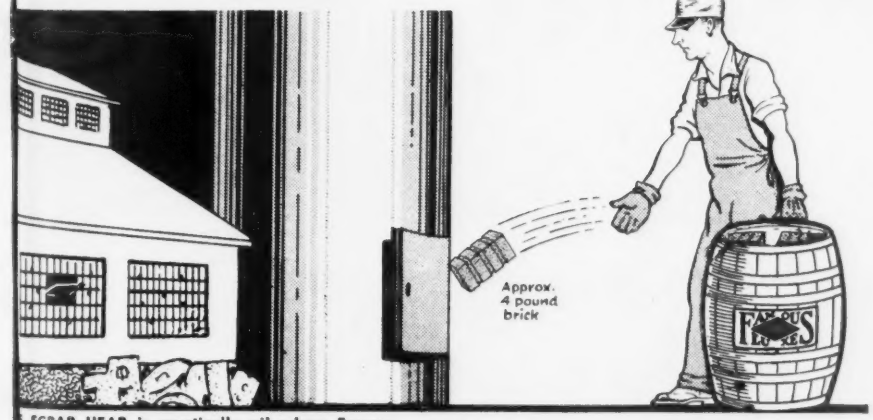
THEY'RE CUT OUT...TO CUTOFF!

EXPORT DEPARTMENT, 765 DREXEL BLDG., PHILA. 6, PA.

YOU CAN PUSH BACK THE CLOCK, BUT *NOT* TIME!

MINIMIZE CASTING MAKE-OVERS, AVOID TIME LOSS, IMPROVE DELIVERIES—BY USING

E SCRAP HEAP before using Famous Cornell upola Flux.



SCRAP HEAP is practically nil where Famous nell Cupola Flux is used.

Famous CORNELL CUPOLA FLUX

THE IRON CLEANSER DEPENDED ON BY LEADING FOUNDRIES IN UNITED STATES AND CANADA.

For more than 33 years, Famous Cornell cupola flux has been the key to better castings. It does a thorough job of removing impurities from molten iron, makes it more fluid and reduces sulphur.

Furthermore, it keeps cupolas at highest efficiency. Drops are cleaner. Bridging over is practically eliminated. And by forming a glazed or vitrified surface on cupola lining, it reduces erosion. Both gray iron foundries and malleable foundries with cupolas, say down time and maintenance cost is practically nil. **PRE-MEASURED SCORED BRICK FORM** is a real labor saver. There's nothing to do but lift it out of container and toss it into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges, as per instructions.

WRITE FOR BULLETIN NO. 46-B

The Cleveland Flux Co.

26-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

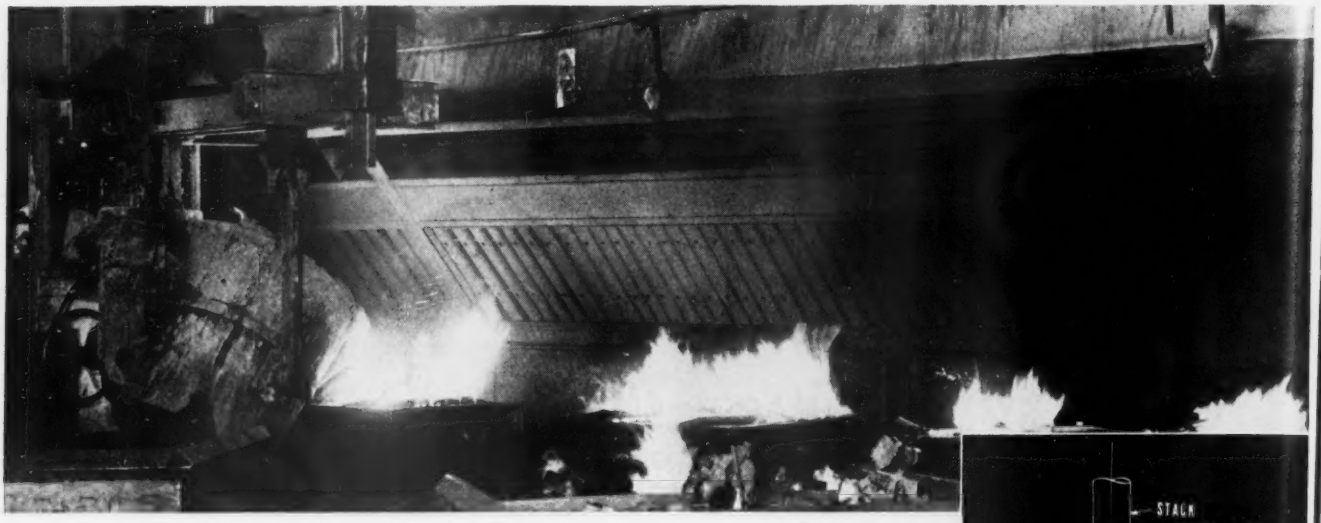
BRASS FLUX

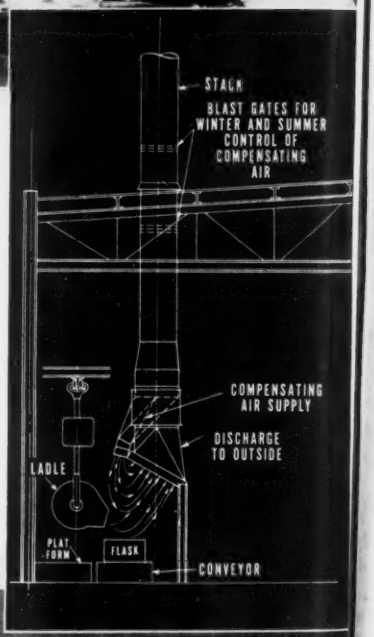
FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions

STUDEBAKER USES *"Compensating"* AIR POURING AND MOLD CONVEYOR HOODS FOR BALANCED FOUNDRY VENTILATION





These photos taken at Studebaker are actual production scenes. Note absence of smoke.

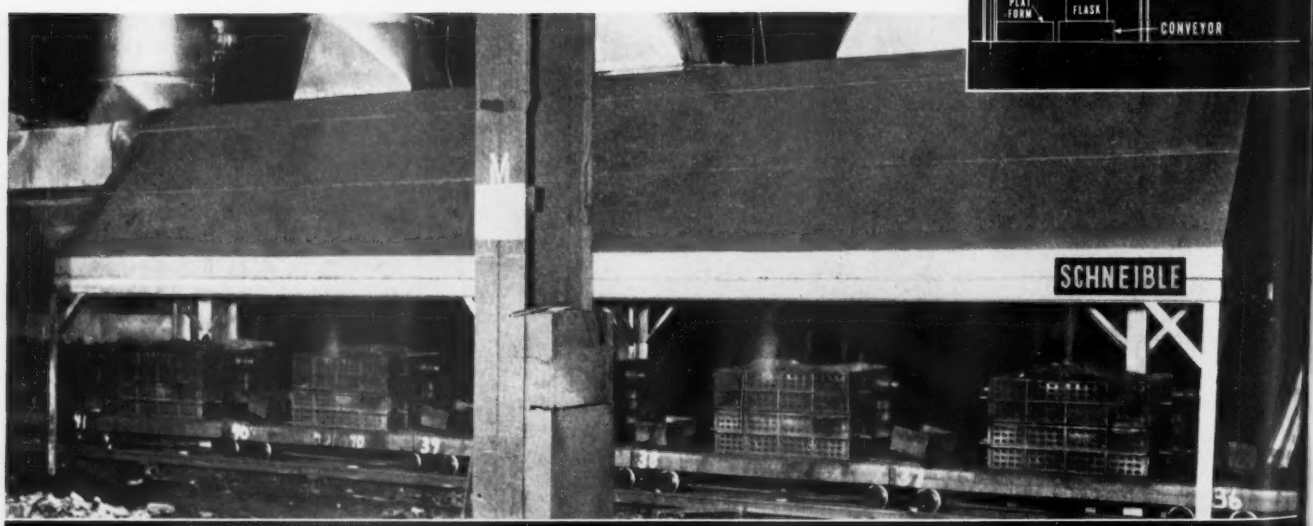
Schneible Uni-flo Hoods with patented "Compensating" air feature are used on Studebaker's pouring conveyor. Mouth organ type louvres in front, furnish air from inside or outside, which "compensates" for dust and smoke laden exhaust air drawn out through vertical louvres in back. Diagram shows air pattern over work area.

Blast control gates for winter and summer operation allow use of outside air to minimize loss of power plant heat in winter and the scavenging of dead hot air from under-roof areas for greater comfort in summer.

These hoods produce better working conditions, more satisfied employees, considerable savings in power plant and dust collector load.

Write for Bulletin 450 for Uni-Flo Hood details

CLAUDE B. SCHNEIBLE CO. P. O. Box 502 Roosevelt Annex
Detroit 32, Michigan



SCHNEIBLE

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Late Foundry News

NOVEMBER 26, 1951

PROLOGUE: A story going the rounds in Washington concerns the visitor who asked a taxi driver the meaning of the expression "History Is Prologue," which he noted engraved on one of the capital buildings. "That," replied the driver, "means you ain't seen nothing yet." The story is used as an apt description of what may be expected of the defense program's impact on the civilian economy in coming months.

FIRST HALF TOUGHER: Defense planners look for the first two quarters of 1952 to be the most difficult period for their program. The military will be taking its biggest bite from available steel and aluminum at that time. Supplies thereafter will be growing while requirements in many instances will be leveling off. Copper shortage will continue and the tendency will be to substitute aluminum where possible. Shortages of other metals and minerals vital to the defense effort also are long-term matters that place increasing emphasis on efforts in the fields of substitution, simplification, standardization and salvage.

SCRAP: High on the list of major problems awaiting solution is that of scrap—ferrous and nonferrous. Although less extensively publicized, the nonferrous scrap situation is the more serious of the two. For the fourth quarter NPA has limited receipts of tolled and purchased aluminum scrap and secondary ingots by primary producers thereby diverting an estimated 5½ million pounds of scrap to scrap dealers and smelters. Various reasons are advanced for the retarded flow of copper-base scrap, although NPA claims scrap is being generated at a rate commensurate with expanded national production. Brass and bronze ingot shipments are off nearly one-third from the 1951 peak but compare favorably with pre-Korean levels. October shipments, according to the Defense Council of the Ingot Brass and Bronze Industry, were 23,124 tons, against monthly averages of 29,414 tons the first nine months this year, 25,300 tons in 1950 and 21,785 the first half of that year.

PRICE CEILING: An amendment to CPR-60, the regulation governing prices of castings, is expected out shortly. Of particular interest to die casters, it would permit adjustments in prices of zinc-base alloy and lead-containing alloy castings to compensate for the recent increase in cost of those alloys. The complete order, which finally became effective Nov. 10, is changed in several respects from its original draft. Short orders are exempt from the regulation, provided these conditions are met: The order requires less than six hours of molding time, involves not more than 50 molds and the selling price does not exceed $300 in the case of steel, gray and malleable iron, aluminum-base, zinc-base or lead-base alloy sand castings or $400 in copper-base or magnesium-base alloy castings. The criteria for die and permanent mold castings are less than six hours' production and a price not over $500.

FOUNDRY EXPANSIONS: Recently approved certificates of necessity for accelerated tax amortization on new or expanded defense facilities include these foundries: Producto Machine Co., Bridgeport, Conn., $365,719; Ross-Meehan Foundries Inc., Chattanooga, Tenn., $252,605; General Motors Corp., Saginaw, Mich., $163,000; General Motors Corp., Bedford, Ind., $842,030; Neenah Foundry Co., Neenah, Wis., $262,260; Dick Brothers Inc., Reading, Pa., $449,717; Dayton Malleable Iron Co., Ironton, O., $83,250; Dayton Malleable Iron Co., Dayton O., $127,500. Other approved certificates in which a portion of the facilities involved was completed or acquired prior to Sept. 23, 1950, apply to these companies: Bay City Foundry Co., Bay City, Mich.; St. Marys Foundry Co., St. Marys, O.; Paul M. Wiener Foundry Co., Muskegon, Mich.; United Engineering & Foundry Co., Canton, O.; Brown Industries Inc., Sandusky, O.; Midwest Foundry Division, L. A. Darling Co., Coldwater, Mich.; Allied Steel Castings Co., Harvey, Ill.; Midwestern Foundries Inc., Garrett, Ind.; General Motors Corp., Danville, Ill., American Steel Foundries, Granite City, Ill.

PROJECTS DELAYED: Despite the tax amortization certificates issued, additional applications are pending and foundrymen complain that delay in approving them prevents elimination of many bottlenecks in castings production. Some requests cover expensive installations of heat treating and laboratory equipment necessary to produce cast armor; others apply to machine tool and similar large castings. Structural steel allocation also brings complaints from foundrymen. One company, needing 100 tons of structurals for an addition, has been allotted 50 tons for first quarter—which means construction cannot proceed. Foundry equipment manufacturers likewise maintain they are not getting enough steel to build the machines urgently needed for the defense program.

SMALL BUSINESS: A new Small Defense Plants Administration has been established at Washington. Intent is to bring all resources of small business into the defense picture and to avoid dislocation of the national economy that might result from difficulty of minor concerns in securing defense work. The agency will place no contracts but will recommend their awarding. It also will check the allocation of materials and act on recommendation of loans to small business.

BIG BUSINESS: Foundries employed an average of 293,626 persons who received a total of slight-

ly over $1 billion in wages and salaries last year, according to the Census Bureau's 1950 Annual Survey of Manufacturers. The industry paid $1,128,070,000 for raw materials, electric power and contract work. Latest employment report by the Department of Labor for ferrous foundries alone shows a 1951 peak of 284,700, recorded in June.

CANADIAN ALUMINUM: Foundries making castings from aluminum ingot imported from Canada are not required to charge the metal against their ingot allotment if the castings are shipped to that country. Companies with Canadian subsidiaries are taking advantage of this provision since ingot is more freely available from across the border. However, Canadian ingot acquired for castings sold in this country is chargeable to the foundry's allotment.

EUROPEAN FOUNDRYMEN: Economic Cooperation Administration plans to make a number of European foundrymen available for employment by United States foundries for a period of six to eight months. Their qualifications range from experienced molders to prominent engineers. ECA will pay for their travel and wages. Purpose is to give the men experience in American practice. Foundries interested in employing these men may obtain additional details from the National Foundry Association, 53 West Jackson Blvd., Chicago. ECA, incidentally, still is looking for experienced American foundrymen to serve with its consulting group in Europe.

CAPEHART AMENDMENT: OPS has ordered the general manufacturers' and machinery regulations (CPR 22 and 30) to become mandatorily effective Dec. 19, and also has issued supplements to each regulation providing for optional adjustments of ceilings under terms of the so-called Capehart amendment, recently passed by Congress. A general overriding regulation is being issued to provide for similar adjustments by manufacturers not covered by CPR 22 or 30.

MISCELLANY: Freight car production reached 10,000 cars in October, highest in 2½ years, but car builders will receive only enough controlled material allotments to turn out 20,000 cars in the first quarter of 1952. . . . Donald E. MacBrien is returning to the Philadelphia Coke Co., Philadelphia, after serving as assistant director of the Coke Division, Defense Solid Fuels Administration. He is succeeded by Horace M. Bringhurst, director of foundry coke sales at Detroit for Semet-Solvay . . . Canadian business of American Air Filter Co., Louisville, after Jan. 1 will be handled by newly formed American Air Filter Co. of Canada Ltd., Montreal. William G. Hole, formerly of Darling Bros., Ltd., will be in charge . . . Business Press Advisory Committee on Scrap recently was formed to help publicize the nation's need for scrap metal. Irwin H. Such, editor, *STEEL*, is chairman of the committee, and Frank G. Steinebach, editor, *FOUNDRY*, is a member of the program subcommittee.

PRICES OF FOUNDRY METALS AND COKE (As of Nov. 26, 1951)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$17.00-18.00
New River	21.30
Wise County	15.95
OVEN	
Birmingham	$20.30
Chicago	23.00
Detroit	24.00
Erie, Pa.	23.50
Everett, Mass.	24.80
Indianapolis	22.75
Kearney, N. J.	22.75
Milwaukee	23.75
Painesville, O.	24.00
Philadelphia	22.70
Neville Island (Pittsburgh)	23.00
Portsmouth, O.	22.50
St. Louis (delivered)	25.40
Swedeland, Pa.	22.60
Terre Haute, Ind.	22.50

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$54.50	$55.00
Birmingham	48.88	....
Buffalo	52.50	53.00
Chicago	52.50	52.50
Cleveland	52.50	52.50
Everett, Mass.	55.25	55.75
Fontana, Calif.	58.50	....
Geneva, Utah	52.50	....
Granite City, Ill.	54.40	54.90
Lone Star, Tex.	48.50	48.50
Neville Island (Pittsburgh)	52.50	52.50
Steelton, Pa.	54.50	55.00
Swedeland, Pa.	56.50	57.00
Toledo, O.	52.50	52.50
Troy, N. Y.	54.50	55.00
Youngstown, O.	52.50	52.50

NONFERROUS INGOT

BRASS AND BRONZE: 85-5-5-5—27.25c; 88-10-2—38.50c; 80-10-10—32.25c; No. 1 yellow—23.25c.

ALUMINUM: 99 per cent plus, primary ingots 19.00c. Secondary No. 12 alloy 19.50c.

MAGNESIUM: 99.8 per cent standard ingots 24.50c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 24.50c, Connecticut valley; Lake 24.62½c, delivered.

ZINC: High grade 20.85c, delivered.

IRON AND STEEL SCRAP

(Ceiling prices per gross ton as established by the Office of Price Stabilization)

	*No. 1 Bundles	Cast Steel	**Steel, 2 ft & less	Punchings, Plate Scrap	Cast Iron Briquets
Birmingham	$39.00	$44.00	$39.00	$41.50	$39.00
Buffalo	43.00	48.00	43.00	45.50	43.00
Chicago	42.50	47.50	42.50	45.00	42.50
Cincinnati	43.00	48.00	43.00	45.50	43.00
Cleveland	43.00	48.00	43.00	45.50	43.00
Detroit	41.15	46.15	41.15	43.65	41.15
Eastern Pa.	42.50	47.50	42.50	45.00	42.50
Los Angeles	35.00	40.00	35.00	37.50	35.00
Pittsburgh	44.00	49.00	44.00	46.50	44.00
San Francisco	35.00	39.00	35.00	37.50	35.00
St. Louis	41.00	46.00	41.00	43.50	41.00
Seattle	35.00	40.00	35.00	37.50	35.00

Above delivered prices are ceiling levels at basing points indicated. *Applies to dealer and industrial scrap; No. 1 and No. 2 heavy melting steel are $1 less; No. 1 railroad heavy melting is $2 higher. **$2 higher if 1 ft or under. $5 higher when steel 2 ft or under is sold to a gray iron foundry.

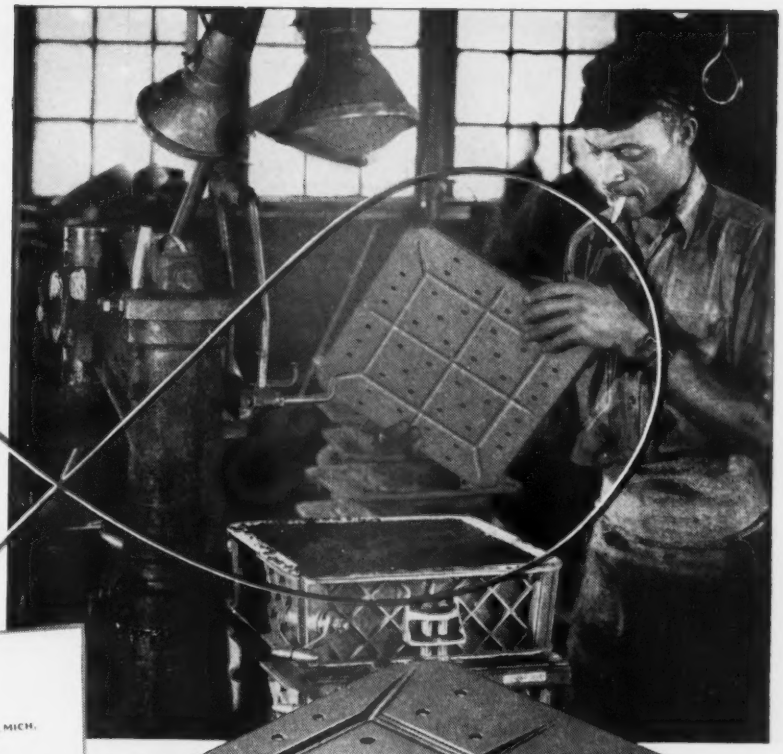
CAST IRON SCRAP

No. 1 cupola cast	$49.00
Heavy breakable cast	45.00
Burnt cast iron	41.00
Cast iron brake shoes	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Iron wheels, No. 1	47.00
Malleable	55.00
Drop broken machinery cast	52.00

Above ceiling prices, per gross ton, are f.o.b. shipping point. Add transportation charges to obtain delivered prices at any foundry.

"EDCO Dowmetal BOTTOM BOARDS have resulted in tremendous savings for our foundry"

... says M. C. Crawford of RILEY STOKER CORPORATION



RILEY STOKER CORPORATION
FUEL BURNING AND STEAM GENERATING EQUIPMENT
101 WALKER STREET, DETROIT 7, MICH.

Christiansen Corporation
1515 North Kilpatrick Ave.
Chicago 51, Illinois

May 16, 1951

Attn: Mr. Edw. S. Christiansen, Pres.

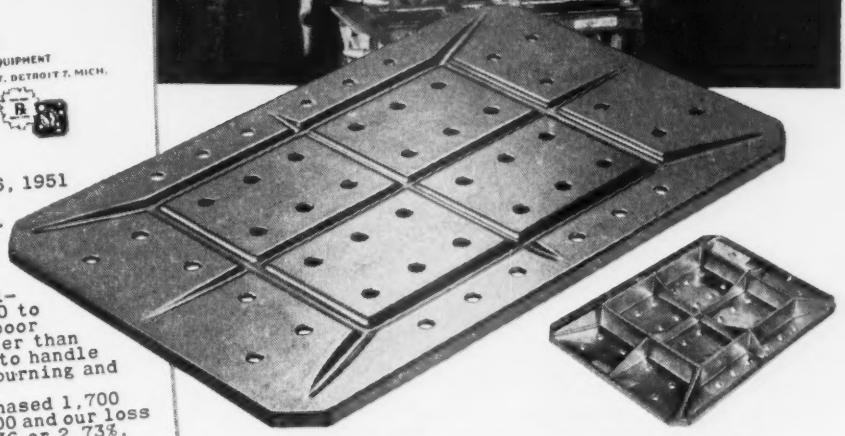
Gentlemen:

Before the purchase of EDCO Dowmetal Bottom Boards, we made our own wood boards at a cost of approximately 70c each. We would make 5,000 to 6,000 per year and ended up with a poor quality board. They were much heavier than EDCO magnesium boards, not as easy to handle on the line, and our losses due to burning and breakage were 60 to 80% per year.

In three years time, we have purchased 1,700 of your boards at a cost of $7,585.00 and our loss in this period has been only $207.36 or 2.73%.

EDCO Dowmetal Bottom Boards have resulted in tremendous savings for our foundry. It is a pleasure to recommend them to other foundries.

Yours very truly,
RILEY STOKER CORPORATION
M. C. Crawford
M. C. Crawford
Director of Purchases
Detroit Plant



Above photo shows molder at Riley Stoker Corporation placing EDCO Bottom Board on flask preparatory to pressing. EDCO DOWMETAL magnesium boards maintain high quality of castings and reduce rejects because the exclusive grooved and vented design permits escape of gasses and insures mold stability.

Riley Stoker Corporation is one of the three largest manufacturers of steam generating and fuel burning equipment in the country. EDCO DOWMETAL Bottom Boards are used exclusively in their foundry in the production of gray iron and alloyed casting components.

Photo at left shows molder pouring sand into flask. Photo at right shows molten metal being poured into molds which rest on EDCO Bottom Boards. Gravity conveyor line carries molds on for further processing.

Progressive foundry operators, like Riley Stoker Corporation, are equipping their foundries with EDCO DOWMETAL Bottom Boards.

Made of magnesium, these boards will not warp or break. There are no nails to come out, nothing to break or split—no upkeep! So durable, they can be considered permanent equipment. The many advantages from the use of these boards are effective immediately on their installation.

Write us or phone CApitol 7-2060 today for complete price schedule and list of 74 standard sizes available from stock.

EDCO CHRISTIANSEN CORPORATION

CHRISTIANSEN CORPORATION

1517 N. KILPATRICK AVE. • CHICAGO 51, ILLINOIS

ALUMINUM ALLOY INGOTS • ZINC BASE DIE CASTING ALLOYS

Powder-Cutting

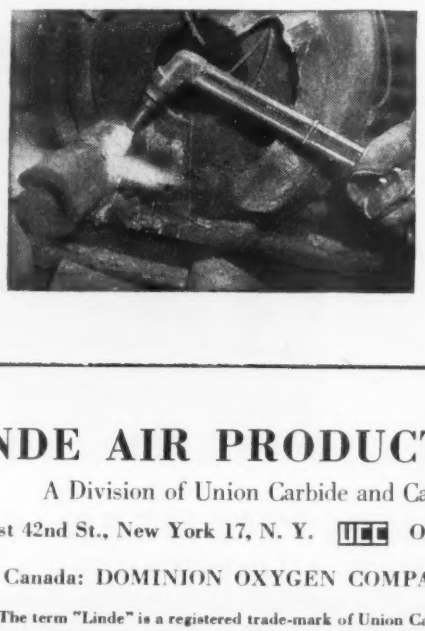
Steps Up Production of Stainless Steel Castings 32 Times . . .

Centrifugally-cast rings of stainless steel are cut in 15 minutes time, increasing production 32 times.

Riser cutting of centrifugally-cast stainless steel rings used to be a difficult and time-consuming job. In one foundry which used a boring machine, this operation took eight hours per casting. When powder-cutting was introduced, the time was reduced to approximately 15 minutes—a 32-fold increase in production.

In another foundry, powder-cutting was profitably used to remove $\frac{3}{8}$ to 1 in. of metal from stainless steel castings. The machining cost for this type of work has been $24.00 per casting. Substitution of powder-cutting brought the overall cost, including finish-grinding and chipping, to $7.53 per casting, and reduced the time from 8 hours to 1 hour. For an order of 60 castings, the foundry saved $988.20 and 360 hours of operating time.

If you have stainless steel or other oxidation-resistant metals to cut, LINDE'S service engineers can show you how powder-cutting methods can be used with profit. Phone or write the nearest LINDE office.



Here, risers on stainless steel castings are being powder-cut—a time saving of 30 per cent over the former methods.

LINDE AIR PRODUCTS COMPANY

A Division of Union Carbide and Carbon Corporation

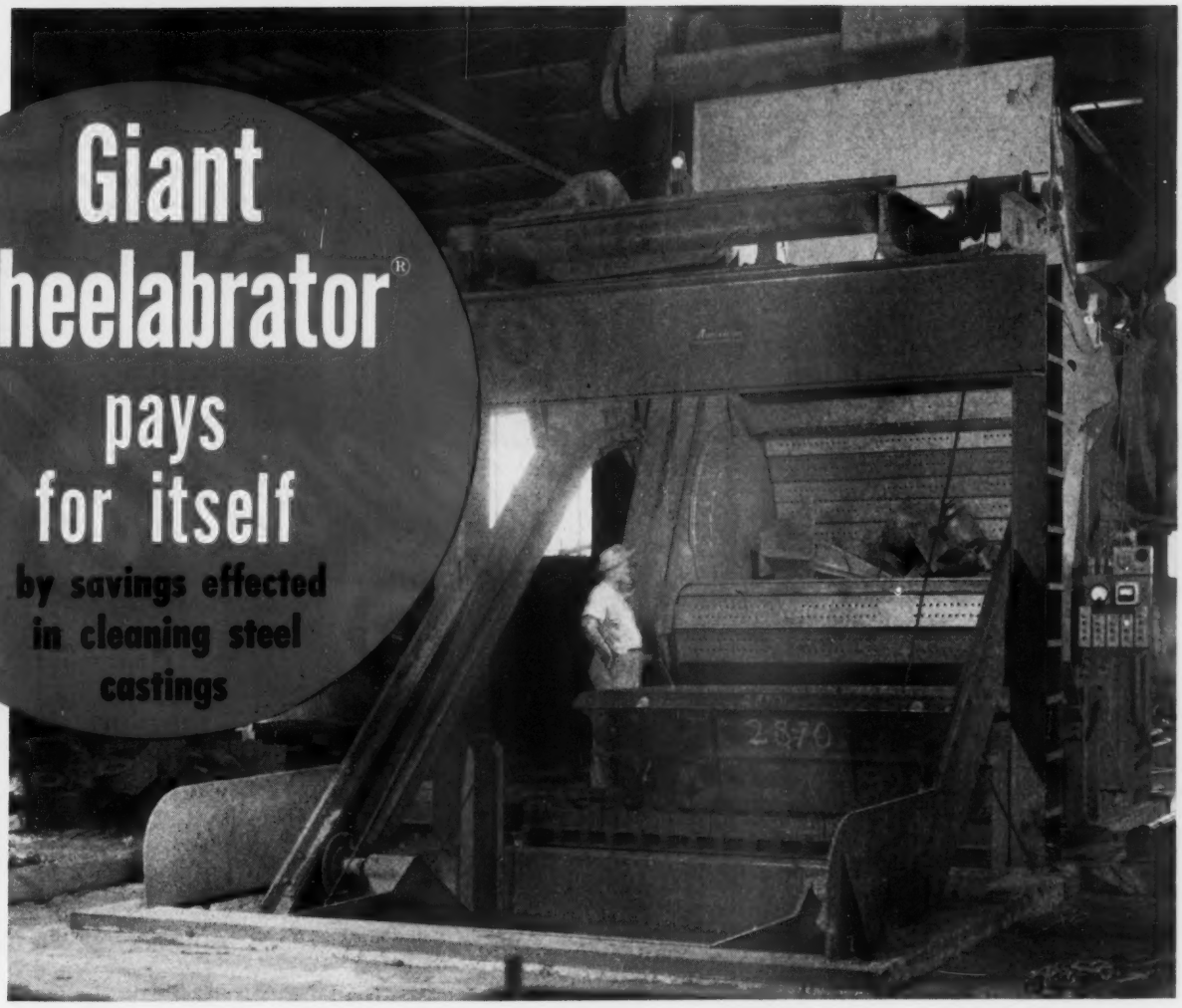
30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation

Giant Wheelabrator® pays for itself

by savings effected in cleaning steel castings

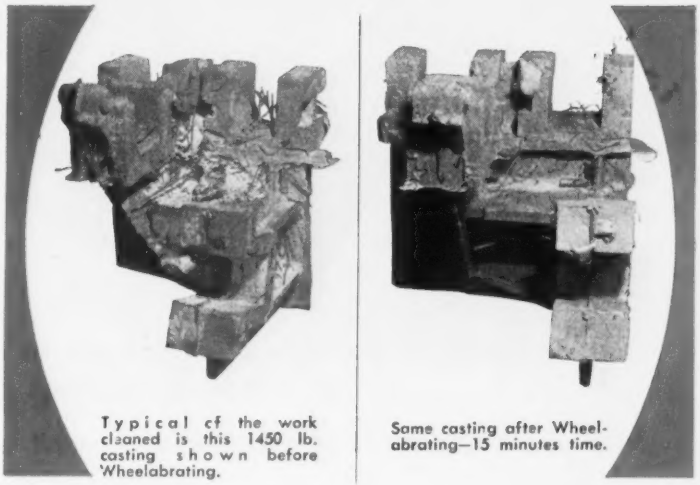


for BIRDSBORO STEEL FOUNDRY and MACHINE CO. *Birdsboro, Pa.*

Savings effected by a 63 cu. ft. capacity airless Wheelabrator Tumblast were sufficient to amortize the entire investment in record time. Cleaning 2 to 3 ton loads of miscellaneous steel castings in just 15 minutes, the giant machine handles 25% more tonnage than was formerly achieved by two air blast table rooms. Daily man-hour requirements have been slashed from 54 to only 11.

Drastic time-and-cost reductions are not the only advantages Birdsboro has realized. Mr. A. L. Wentzel, Works Manager, sums it up this way: "The fact that our castings are cleaned much better reduces chipping and grinding time and gives us an improved customer satisfaction. On every score the Wheelabrator has been an excellent investment."

Like to duplicate this story? Why not have a Wheelabrator engineer survey your cleaning requirements for similar cost-cutting results. Write for information today.



Typical of the work cleaned is this 1450 lb. casting shown before Wheelabrating.

Same casting after Wheelabrating—15 minutes time.

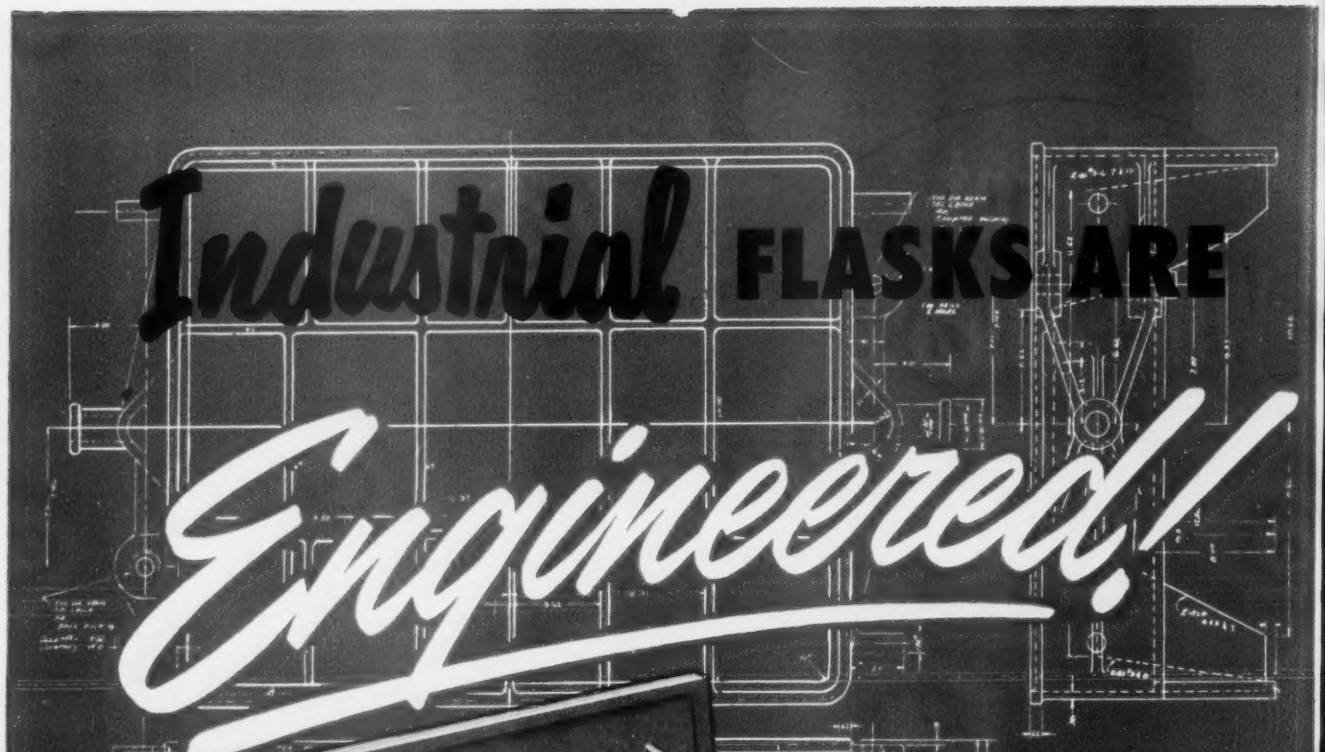
American

WHEELABRATOR & EQUIPMENT CORP.

505 S. Byrkit St., Mishawaka 2, Indiana

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

D3237



The right flask on the right job at the right price, will help you produce castings at a profit.

Expanded facilities permit quick deliveries

Write for Catalog

I.F.I.

INDUSTRIAL FABRICATING, INC.

817 HALL STREET ★ EATON RAPIDS, MICHIGAN ★ TELEPHONE 6781

Sales Representatives: **Industrial and Foundry Sales, Inc., Eaton Rapids, Mich.**
IN CANADA: Don Barnes Foundry Supplies & Equipment, 42 James Street, South Hamilton, Ontario

DoALL FRICTION SAWING REDUCES FOUNDRY CLEANING ROOM COSTS THROUGH FASTER CUTTING AND CLOSER TRIMMING

● Cooper Alloy Foundry, Hillside, New Jersey, uses the 36" DoALL Zephyr high speed band machine at left, for *friction sawing* to remove gates and risers from stainless steel castings.

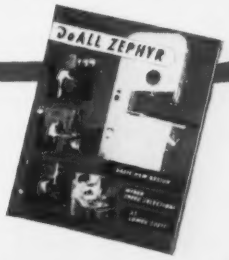
NOW – A NEW DoALL SAW BAND SPECIALLY DESIGNED FOR FRICTION SAWING AVAILABLE FROM LOCAL STOCK

NEW DoALL Friction Saw Bands have the teeth *locked in* by a special heat process giving you longer band life at lower cost. Increased production makes these bands readily available from local stocks. All are packaged in the exclusive DoALL "strip out" container for safety, convenience and band protection. There are DoALL Saw Bands for every job: precision filing, grinding, sawing, honing, polishing, friction sawing and cutting of all types of ferrous, non-ferrous metals and most all non-metallics.

BY using DoALL high speed band machines for *friction sawing* (heat concentration to soften the metal ahead of the saw band) many foundries have stepped up production as much as 10 times over other cutting methods, including flame cutting. The cut is made at speeds of 10,000 to 15,000 F.P.M. Even though these high speeds build up great frictional heat there is little or no danger of "skin hardening" or heat penetration into the wall of the work.

Best for shape cutting, the narrow DoALL Saw Band used lets the operator remove material easily from hard-to-get at spots. Secondary grinding operations are minimized because DoALL *friction sawing* leaves a finer finish. Cut all ferrous materials up to 1" thickness the DoALL *friction sawing* way. Ask for FREE DEMONSTRATION in your foundry. Call your local DoALL Sales-Service Store or write:

THE DoALL COMPANY • 254 N. Laurel Ave., Des Plaines, Illinois

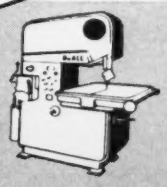


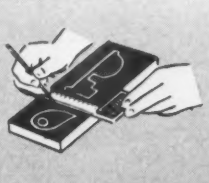
WRITE FOR BULLETIN

DoALL

BMF-2

CALL DoALL FOR:





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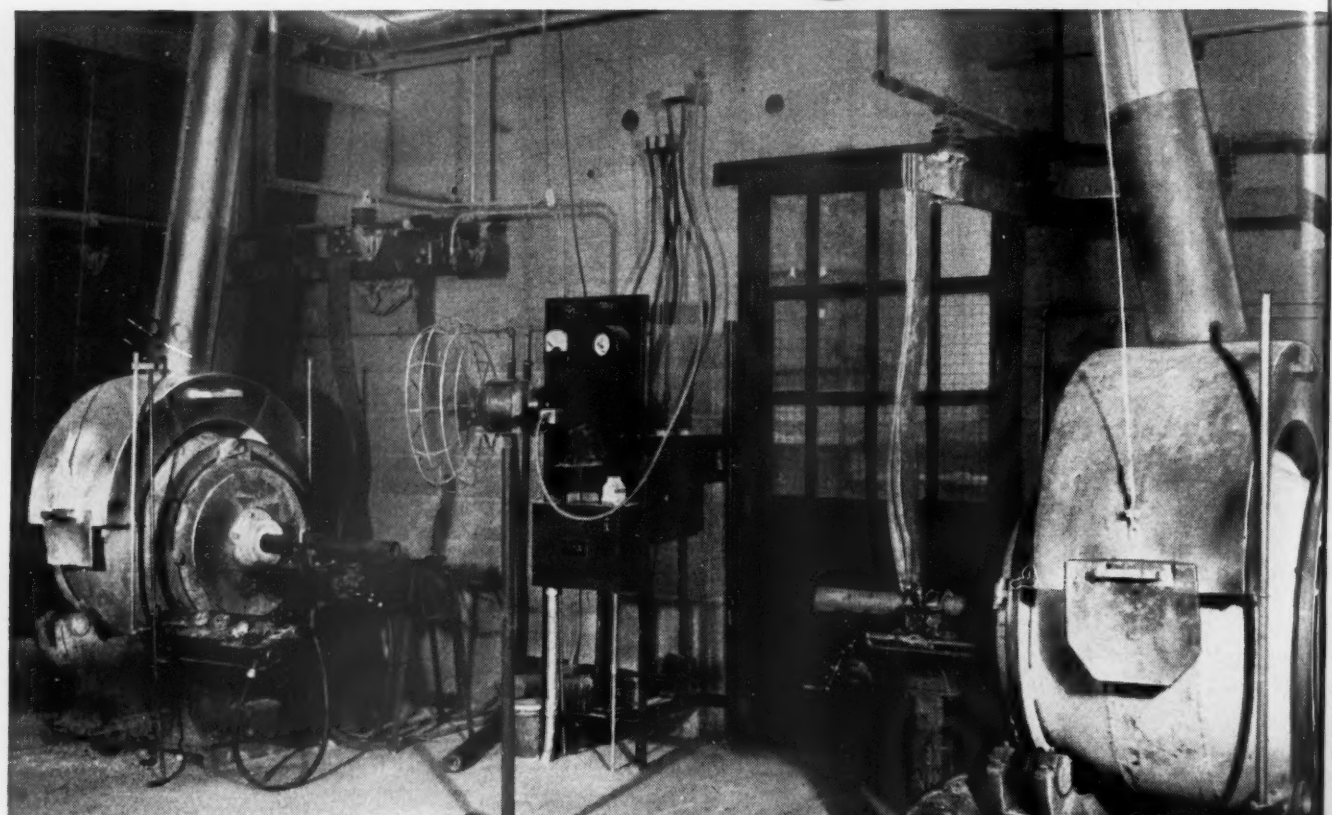
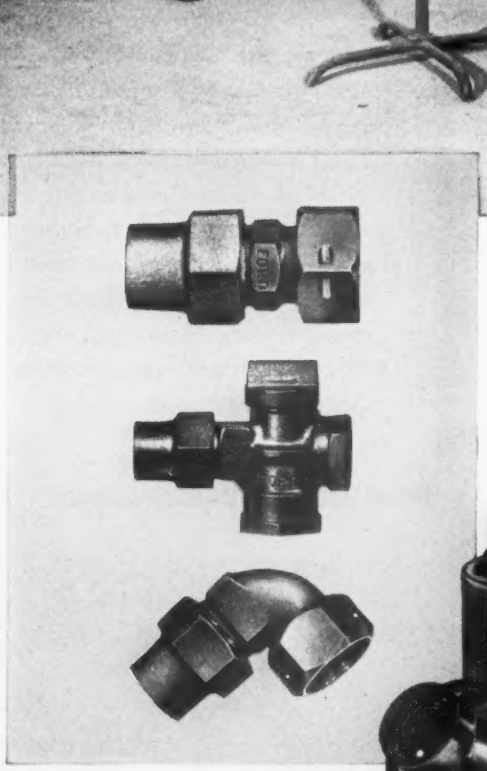
Better Castings and a



▲ *Two 350 lb. Type LFC Detroit Rocking Electric Furnaces melt all brass used at Ford Meter Box Company, Wabash, Indiana. Note ventilating hoods, clean installation.*



◀ *Ford valves and couplings are shown in panel at left. These brass articles are typical of the many cast from DEF metal at Ford Meter Box Company.*

◀ *The double-lid water meter boxes, left, are one of the types of installations made by Ford for municipalities from coast to coast. This is for outdoor use.*

Cooler, Cleaner Foundry

DETROIT ROCKING ELECTRIC FURNACES

are the answer at this progressive Midwest company

To beat corrosion, Ford Meter Box Company uses a lot of brass in the manufacture of settings, valves, couplings and adapters for water meter boxes. All this red brass is melted efficiently and economically in two Detroit Electric Furnaces, and castings are made in an exceptionally clean, comfortable foundry department, in which furnaces and casting operations are completely ventilated.

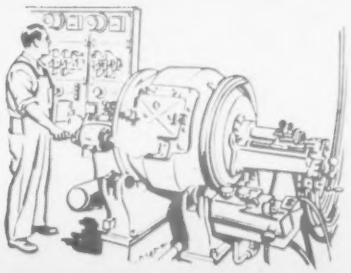
With Detroit furnaces, melt analysis is controlled to very close variations, with metal of the desired characteristics produced by each heat. Accurate temperature control, too, follows the pattern of fastest, most efficient operation. The rocking action of Detroit furnaces assures homogenous melts, and—because of the washing action of the molten metal over the lining—a more complete utilization of generated heat.

Detroit Rocking Electric Furnace advantages are many and important: Positive control of composition and quality, less metal shrinkage, more efficient use of power, more heats per day, less out-of-production time because of easy shell replacement.

Furnaces have capacities from 10 to 4000 lbs., individually designed for your electrical specifications.

Want high operating economy, high quality melts and castings? Get full information on Detroit Rocking Electric Furnaces. Write today!

Faster melts, better melts



ROCKING ACTION DOES IT!

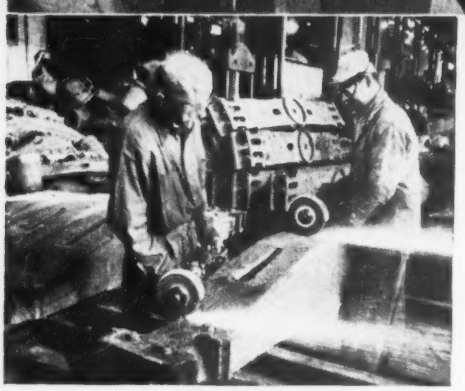
DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: In BRAZIL—Equipamentos Industrias "Eisa" Ltd., Sao Paulo, CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y., MEXICO: Casco, S. de R. L. Atenas 32, Despacho 14, Mexico City, D. F.

What's U. S. Rubber doing to grind railroad parts?

U.S. Royalite Wheels being used in a foundry to grind railroad car couplers.



Same foundry using U. S. Royalite® Wheels to smooth casting of a railroad bolster. This foundry has used "U. S." Wheels for 16 years.

Many a steel foundry across the country standardizes on U. S. Rubber's grinding wheels. Behind each "U. S." wheel are the great research facilities of "U. S." in bonds and abrasives, built up in the last 88 years. United States Rubber technicians can precisely engineer each wheel to your requirements. And if your operating conditions change, these technicians can quickly design a wheel to meet them. Write to address below.

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE

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VIBRATION

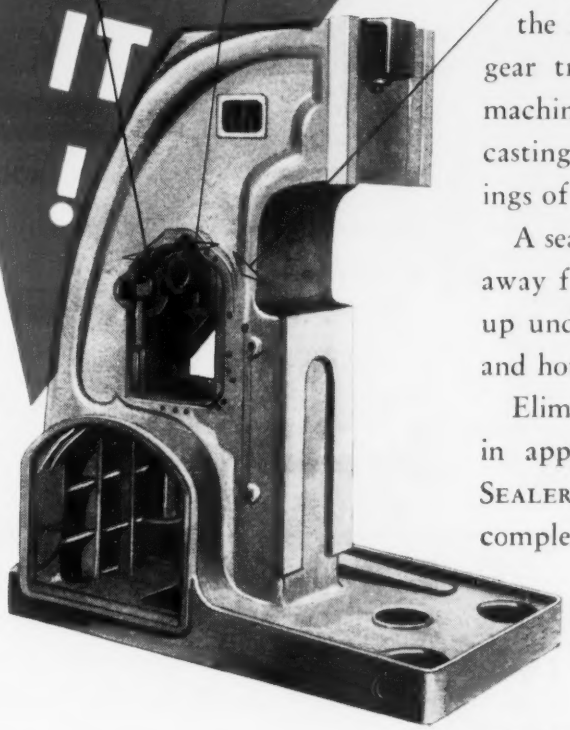
HOT OIL

TOUSEY PRODUCTS

CASTING SEALER

TOUSEY FINISHES CAN TAKE IT!

FRICTION



TOUSEY CASTING SEALER is used to coat the interior of cutting fluid reservoirs and gear train compartments in massive milling machines, sealing slight imperfections in the casting and effectively covering minute leavings of blasting sand or dirt.

A sealer of this type must not crack or flake away from machined surfaces, and must hold up under almost constant vibration, friction and hot oil.

Eliminate production headaches; assure ease in application by using TOUSEY CASTING SEALERS. A letter or postal card will bring complete information.

TOUSEY VARNISH CO.

520 West 25th Street, **Chicago,** Ill.

EVERY SHOP NEEDS THIS TOOL OF A HUNDRED USES . . .

CLECO B-1 PNEUMATIC SCALING TOOL for

- Swivel control valve prevents twisting of air hose
- Air admitted by hand pressure on tool
- Adjustable throttle valve controls power
- Steady jet of exhaust air removes chips
- Positive and sturdy chisel retainer

WRITE FOR BULLETIN 84

- Removal of weld splatter
- Rust and paint scrapings
- Cleaning sand from small castings
- General scaling, beading and peining

MODEL B1-AJ

MODEL B1-BV

CLECO CHIPPING HAMMERS (heavy and light duty)

CLECO TRIPLE SCALER

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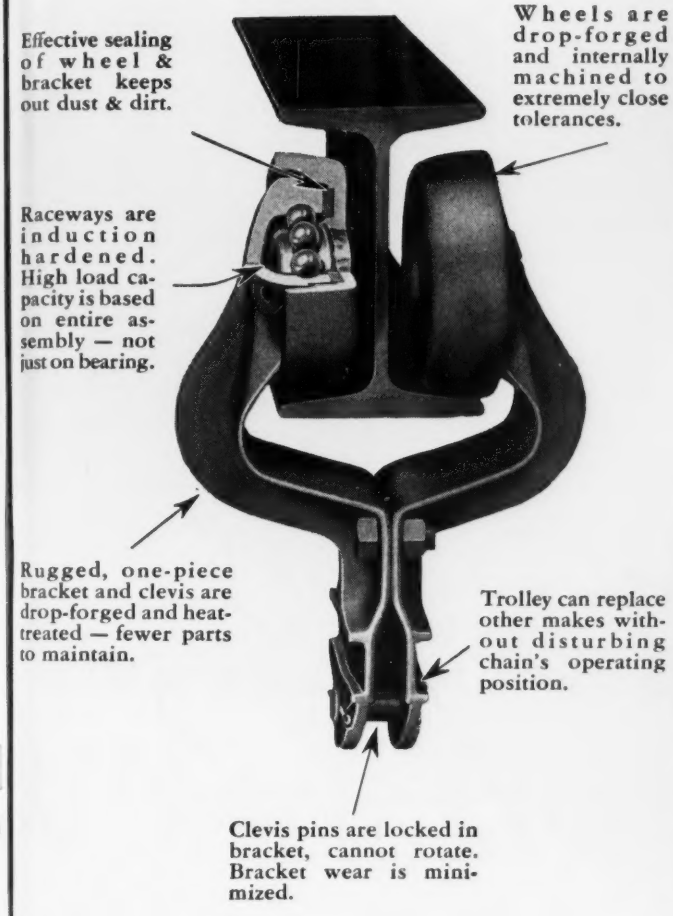
Superior components PLUS Engineering ingenuity


Effective sealing of wheel & bracket keeps out dust & dirt.
Wheels are drop-forged and internally machined to extremely close tolerances.
Raceways are induction hardened. High load capacity is based on entire assembly — not just on bearing.
Rugged, one-piece bracket and clevis are drop-forged and heat-treated — fewer parts to maintain.
Trolley can replace other makes without disturbing chain's operating position.
Clevis pins are locked in bracket, cannot rotate. Bracket wear is minimized.

High capacity in compact space is provided by 330-ft. overhead trolley mold conveyor, part of complete Link-Belt installation at Wagner Malleable Iron Company, Decatur, Ill. Platform conveyor on which pourer stands is synchronized with mold conveyor.

Note rugged construction of chain, hanger and one-piece bracket and clevis attachment of 285-ft. Link-Belt overhead castings collecting conveyor at Wagner.

You can make your overhead trolley conveyor dollars go farther by calling in Link-Belt while you're still in the planning stage. Link-Belt makes the finest trolley on the market today. Equally important, our specialists can draw on the world's largest, most varied background of conveying and power transmission application.

Pouring molds on the run. Handling castings smoothly from shakeout to shipping. Transporting cores to foundry operation. Dumping sprues automatically at discharge points.

Link-Belt Overhead Trolley Conveyors do all these jobs to release valuable manpower for productive work . . . to increase output. And they free floor space, too.

Why not have a Link-Belt foundry specialist help you and your consultants plan peak production results? Write for Book 2330.

LINK-BELT

OVERHEAD TROLLEY CONVEYORS

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12.344

PSC

Light-Weight

ANNEALING EQUIPMENT

in Any Size

From mammoth covers requiring a flat car for shipment to midget boxes you can hold on a hand, PSC annealing equipment is made in any size that will help you get minimum handling time and maximum furnace capacity. Efficiently sized PSC containers recently increased by 100% the output of the furnaces of a well-known malleable foundry. In each furnace 22 stands of PSC light-weight sheet alloy boxes replaced 18 stands of bulky, space-wasting cast boxes, resulting in doubled capacity.

Heat-Treating Equipment for Every Purpose

Carburizing and Annealing Boxes
Baskets · Trays · Fixtures
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Annealing Covers and Tubes
Pickling Equipment
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Tumbling Barrels · Tanks
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Weigh Up to ⅔ Less. Cut Handling and Fuel Costs.

PSC welded alloy units save time because, being 2/3 lighter than cast equipment, they handle faster; and require less time to attain pot heat. A recent study of one customer's cycle showed a total saving of 5 hours. By repeated records, their service life is 2 to 7 times that of cast units. Let our technical staff work with you in devising time-saving units. As pioneers of light-weight, sheet alloy, heat-treating containers and fixtures, we make available to you a wealth of designing and production know-how. We fabricate in any alloy. Send blue-prints or write as to your needs.

PRESSED STEEL PSC

THE PRESSED STEEL COMPANY
of WILKES-BARRE, PENNSYLVANIA

Industrial Equipment of Heat and Corrosion Resistant WEIGHT-SAVING *Sheet Alloys*

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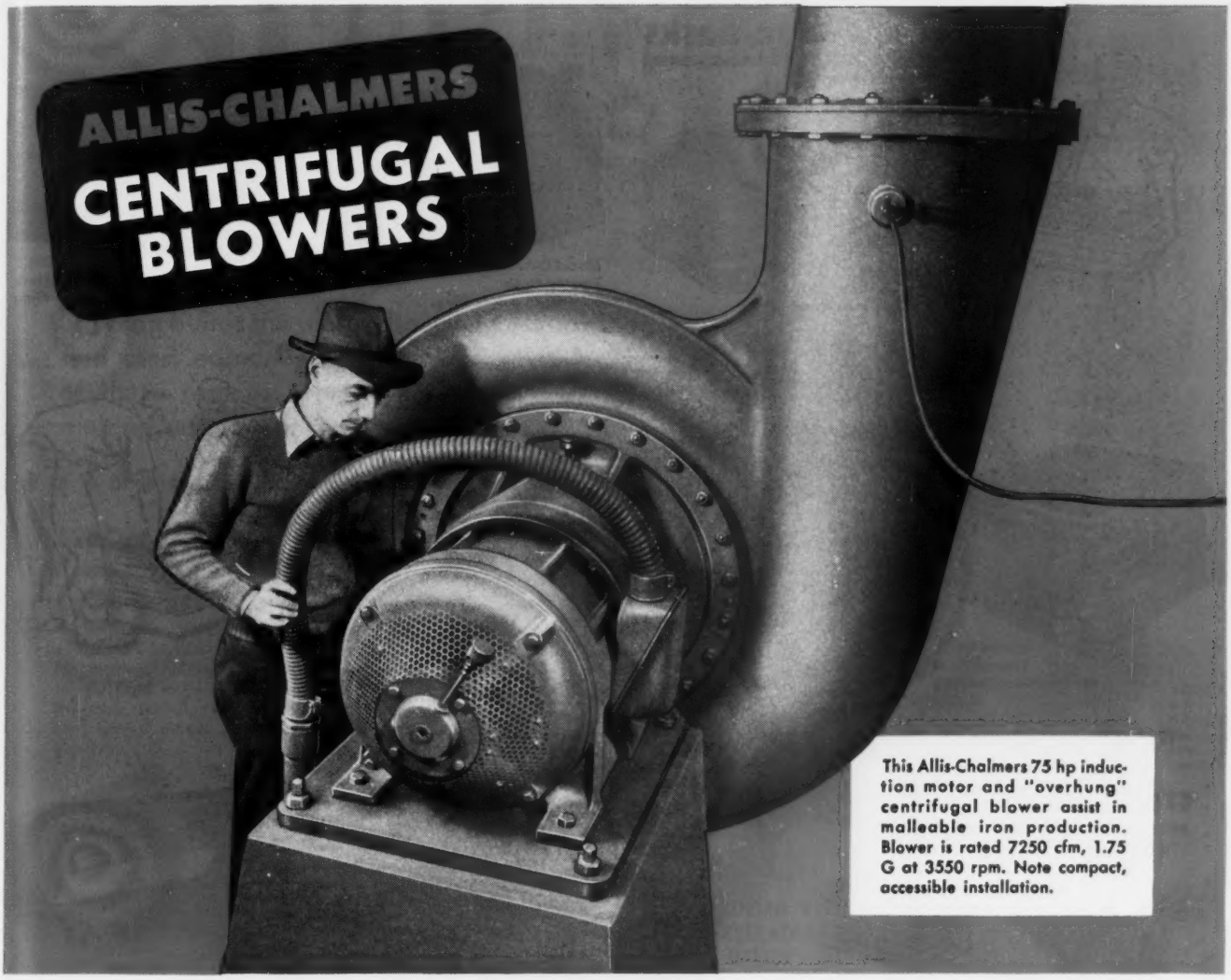


This Allis-Chalmers 75 hp induction motor and "overhung" centrifugal blower assist in malleable iron production. Blower is rated 7250 cfm, 1.75 G at 3550 rpm. Note compact, accessible installation.

Where Control is Vital!

RIGID QUALITY CONTROL is vital when you're making malleable iron. With component elements demanding precise control, cupola operation becomes especially critical.

The Allis-Chalmers centrifugal blower seen above performs this demanding duty 20 to 22 hours daily at the foundry of a large Midwestern malleable iron company.

The constant air weight control on the blower inlet *automatically* delivers more or less air, as required, without the necessity of blowing off to atmosphere and wasting power, as with positive pressure blowers. Connection below flange at upper right goes to discharge pressure gauge.

A metered amount of oxygen enters the cupola, giving a uniform temperature and greater uniformity in composition of the metal. *Wherever* a quality product is desired, consider Allis-Chalmers blowers with constant air weight control. You get these standard features:

- Compact, close coupled design.
- Low noise level, long lived cast iron casing.
- Anti-friction bearings supporting the impeller, only moving part.

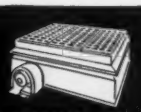
For complete information call your nearest A-C sales office or write to Allis-Chalmers, Milwaukee 1, Wis. for Bulletin 16B6048A. A-3430

ALLIS-CHALMERS

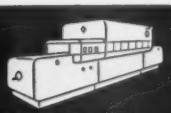
Foundromatic and Regulex are Allis-Chalmers trademarks.

A-C ALLIS-CHALMERS

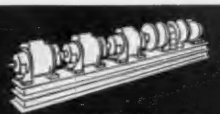
Foundry Equipment for Bigger Output-Better Working Conditions!


FOUNDROMATIC SHAKEOUTS

MOTORS-DRIVES-CONTROL


FOUNDROMATIC CORE DRYER

INDUCTION HEATING & MELTING


REGULEX ARC FURNACE CONTROL

"We need one-man flasks"

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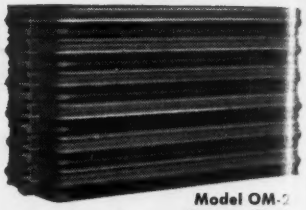
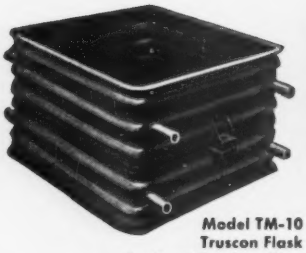
Truscon Flask
for One-Man Handling.

Model OM-4
Truscon Flask
for One-Man Handling.

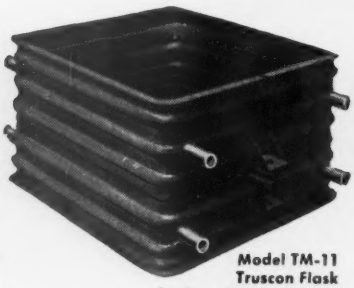


Model OM-2
Truscon Flask
for One-Man Handling

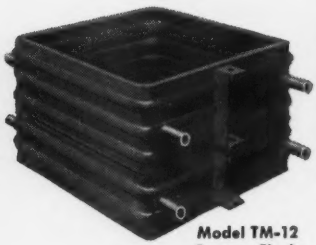
"We need two-man flasks"



Model TM-10
Truscon Flask
for Two-Man Handling



Model TM-11
Truscon Flask
for Two-Man Handling.



Model TM-12
Truscon Flask
for Two-Man Handling

"We need crane flasks"

Model CH-30
Truscon Flask
for Heavy Duty

Model CH-40
Truscon Flask for Extra Heavy Duty.

Model CH-20
Truscon Power Handled Flask.

Truscon supplies them all!

Over 20 years of experience in flask engineering and production has given Truscon a know-how that is outstanding in the industry.

Exceptional strength and rigidity are built into Truscon Steel Flask walls.

The ribs and flanges extend full depth around the entire flask without buckling or cutting away the metal. The flange on the filling side is turned out so it will not interfere with filling or shaking out. The flange on the bottom side or parting line is turned in, forming a sand strip to carry the sand.

A wide range of welded handles and pin lugs is available. Every Truscon cope, drag and check is one integral piece of steel.

Write for catalog showing the wide range of Truscon Steel Flasks that can be manufactured.

TRUSCON
MARK OF MERIT
PRODUCTS

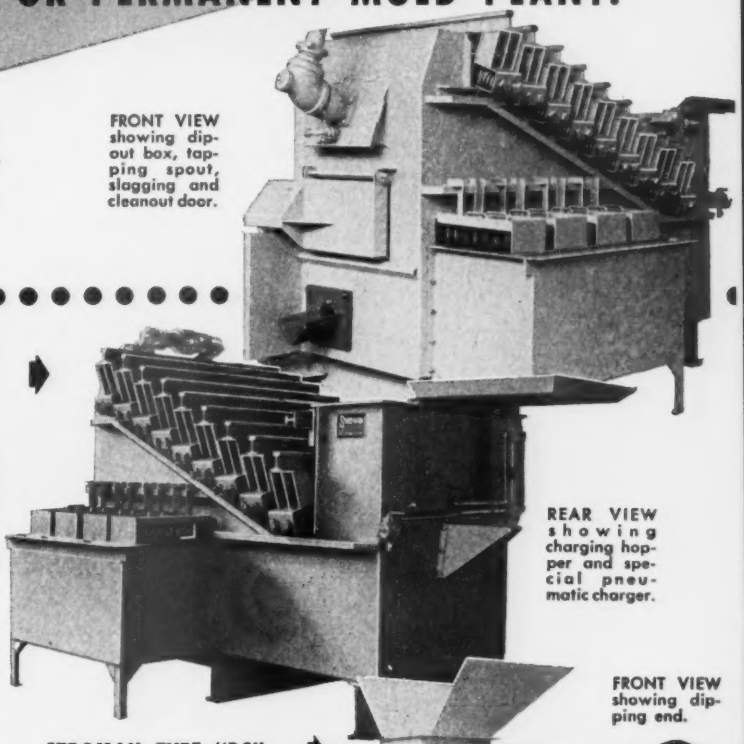
TRUSCON STEEL COMPANY

PRESSED STEEL DIVISION • 6202 TRUSCON AVENUE • CLEVELAND 4, OHIO
SUBSIDIARY OF REPUBLIC STEEL CORPORATION

STROMAN FURNACES

FOR *Every* ALUMINUM MELTING JOB IN *Any* FOUNDRY, DIE CASTING OR PERMANENT MOLD PLANT!

Stroman builds the most efficient, fastest melting and most economical furnaces available. One of these famous four will handle your every melting requirement at great savings.



FRONT VIEW showing dip-out box, tapping spout, slagging and cleanout door.

REAR VIEW showing charging hopper and special pneumatic charger.

STROMAN TYPE "MC" ALUMINUM DIP-OUT REVERBERATORY FURNACE

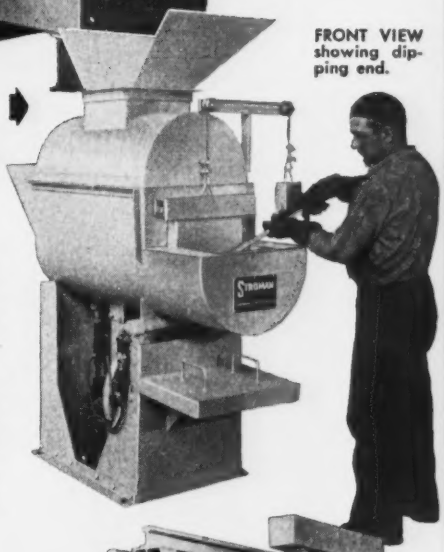
Bath capacity from 500 to 10,000 lbs. Aluminum

A combination of breakdown and holding furnaces makes this the most economical furnace ever designed for aluminum melting. It can be used for melting, holding, alloying, fluxing, for either casting or producing ingots. Cold metal does not reach the molten bath. Hot metal is always available for dipping. No iron pots or crucibles to buy. Oil, gas or combination oil-gas fire. Complete automatic controls are available if desired.

FRONT VIEW from charging end showing a Stroman Skip Hoist.

STROMAN ECONOMELT REVERBERATORY FURNACES

Featuring the famous Stationary Lip Pour which assures a constant pouring arc and eliminates the necessity of moving the ladle at any time during the pour. The Economelt is without a doubt one of the finest reverberatory furnaces ever built. Melting speeds for Aluminum, Brass, Bronze, or Grey Iron are unsurpassed. All metal is preheated and melted in suspension in the throat of the hopper. This furnace is showing upwards of 40% savings in fuel costs. Oil, Gas or Combination Oil-Gas Fire. Charging Hoist and Furnace tilting are operated hydraulically. Hydraulic systems are furnished as complete units including operating valves, etc. Capacity in Aluminum up to 10,000 lbs. total bath. Write for Bulletin No. 635 for complete information.

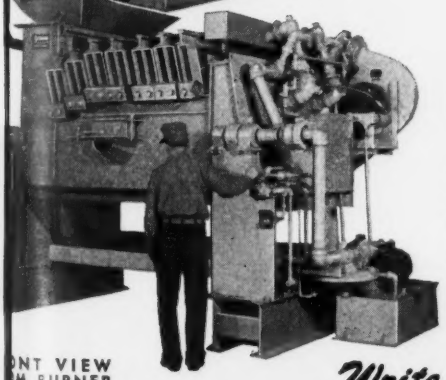


FRONT VIEW showing dipping end.

STROMAN TYPE "DS" REVERBERATORY FURNACE FOR MELTING ALUMINUM

300 and 500 lbs. bath capacities.

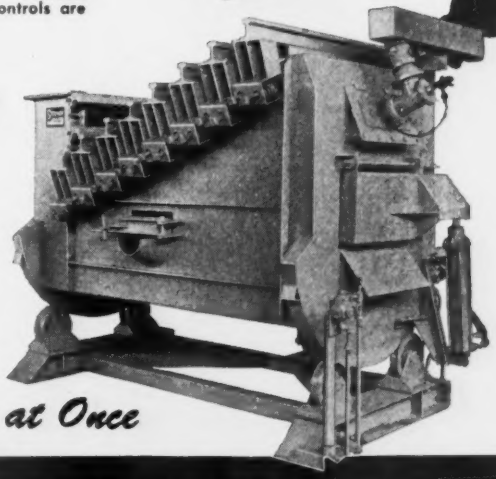
The "DS" Furnace provides a complete melting unit for each Die Casting Machine or Small Permanent Molds. It is a small compact unit that may be easily moved to any desired position in the plant. Eliminates the necessity of having both breakdown and holding furnaces. Saves over 50% in fuel costs over any other type. Ingots and returns are melted where they are cast. There is no handling of hot metal except to the die or mold. Metal is melted in a reducing atmosphere and is free from porosity with little or no dross. Complete automatic controls are available if desired.



FRONT VIEW SHOWING BURNER

STROMAN TYPE "SW" ECONOMELT REVERBERATORY FURNACE

Same as Economelt described above except that it is tilted by an air ram, and does not incorporate Stationary Lip Pour. It is excellent as a breakdown furnace for ingot and returns, in die or sand casting and permanent mold plants. Suitable for re-alloying returns or running back machine shop scrap. A large opening is provided below burner equipment to facilitate such operations as drossing, fluxing, alloying, or puddling back light scrap or returns.

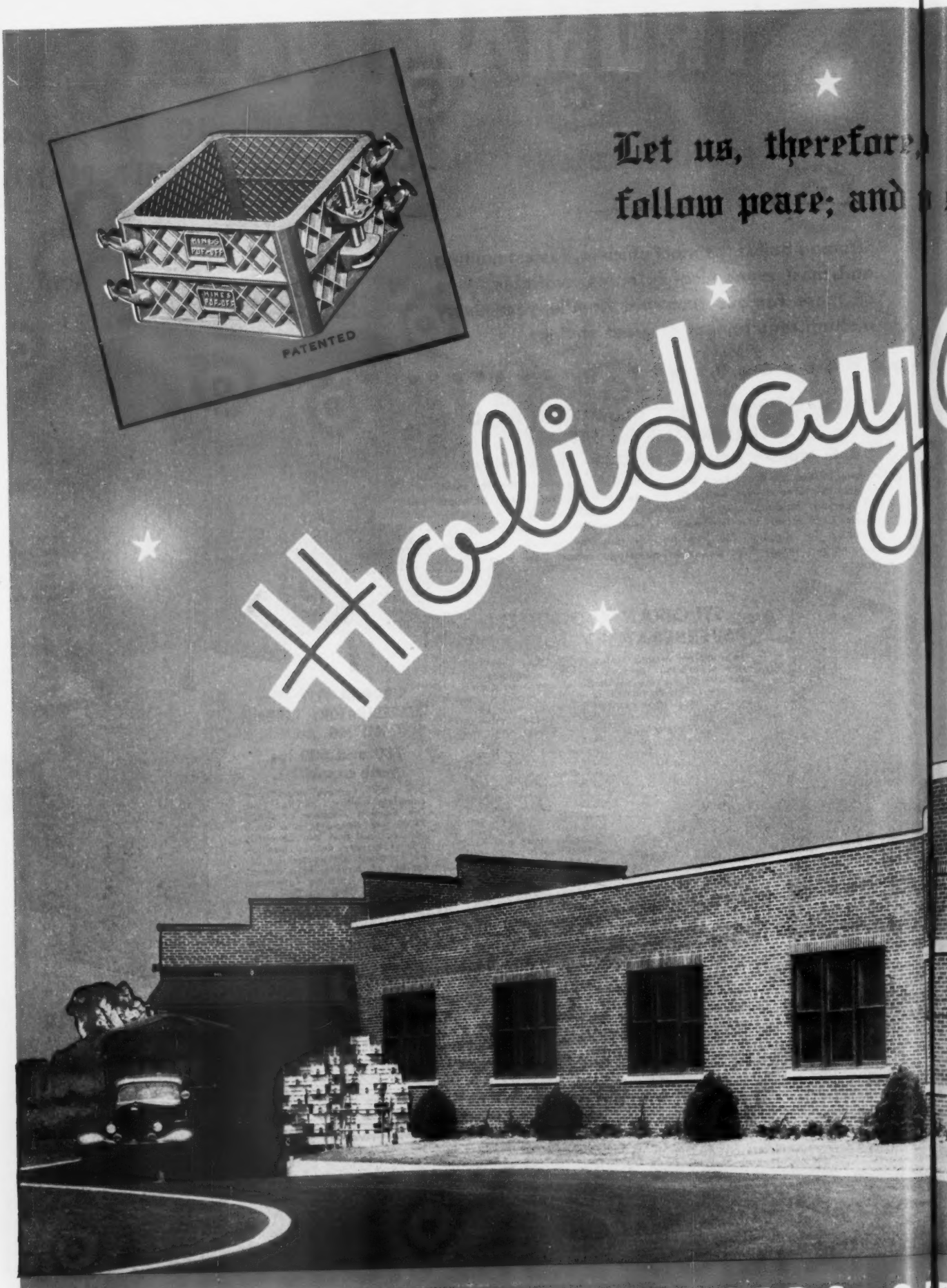


Write for Complete Information at Once

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.


Let us, therefor
follow peace; and
Holiday
PATENTED
THE EXCLUSIVE PRODUCERS O

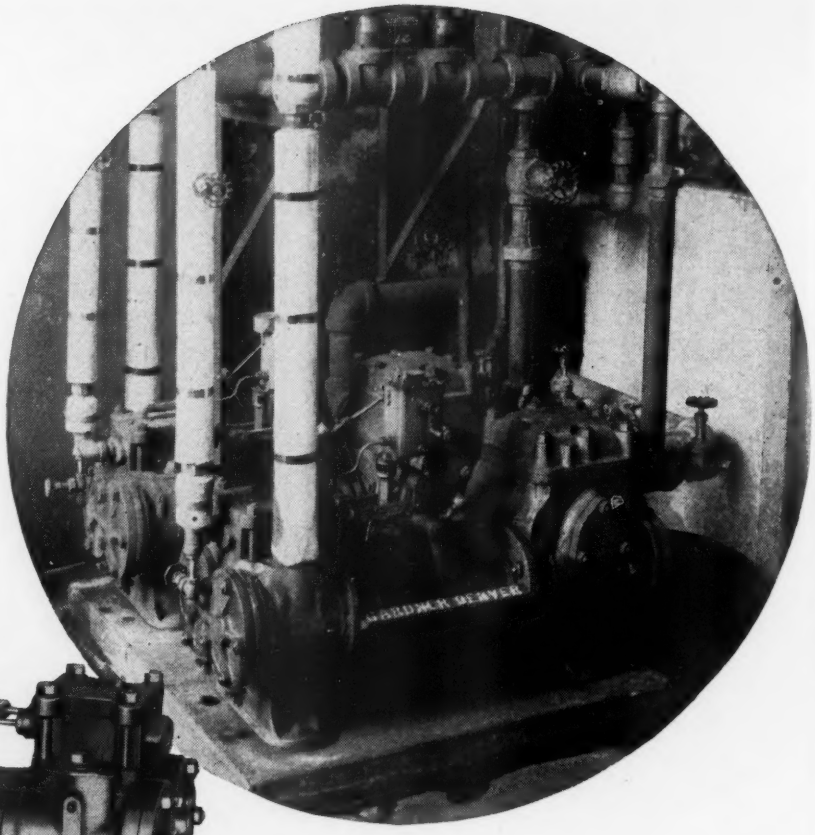
fast to those who religiously
such as only pretend to desire.

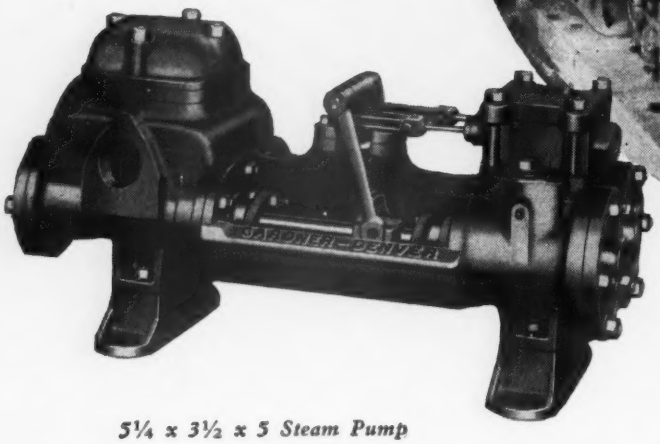
—*Apocrypha: 1. Clement, vii, 13*

Greetings

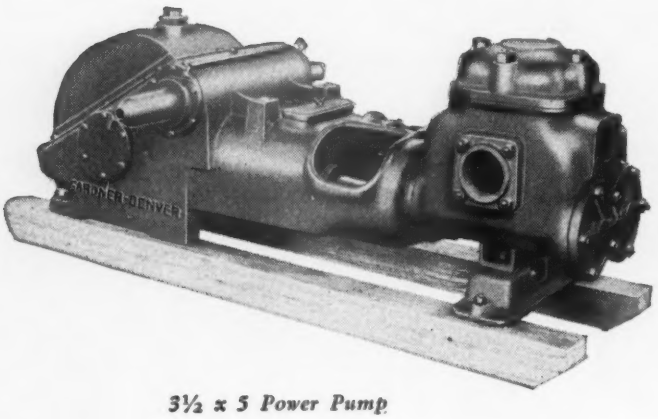
POP-OFF FLASKS AND JACKETS

2-Way Economy with GARDNER-DENVER Boiler Feed Pumps





5¼ x 3½ x 5 Steam Pump



3½ x 5 Power Pump

1. POWER ECONOMY! Gardner-Denver Steam Pumps have short and direct steam ports for greatest steam economy. The steam valves stay tight at all steam pressures.

Gardner-Denver Power Pumps are equipped with friction-defying Timken tapered roller main bearings. Herringbone gears and large eccentric bearings transmit more of the power into useful pumping.

2. IN THE SIZE YOU NEED! Gardner-Denver Boiler Feed Pumps are manufactured in a wide range of sizes, for any type of drive. Our pumping experts will gladly help you select just the right combination for maximum economy in your plant.

Write us today for further information.

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Gardner-Denver Company, Quincy, Illinois
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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

10 reasons why your best bet in bearings is TIMKEN®

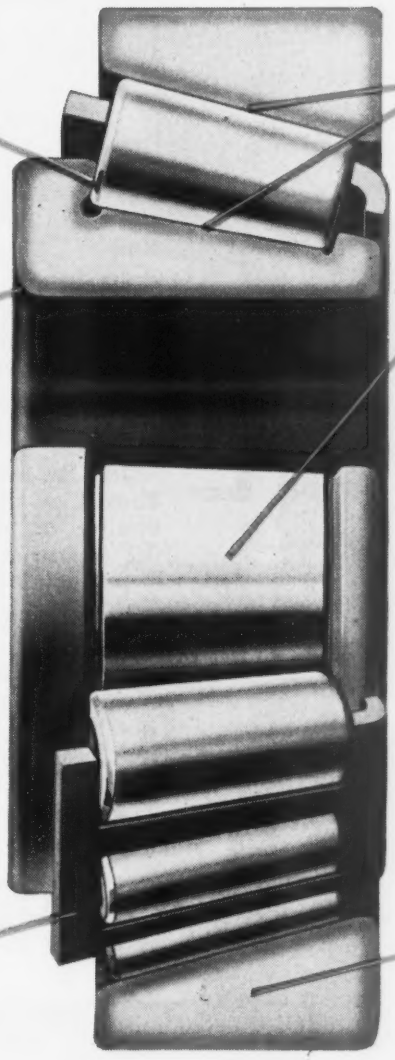
1 *Rib of cone maintains roller alignment, prevents skewing, assures maximum bearing capacity.*

2 *Generous radius permits greater shaft strength.*

3 *Available in 26 different types.*

4 *Precision manufactured. Available with runout tolerance of only seventy-five millionths of an inch (.000075").*

5 *Soft steel cage separates rollers, prevents scuffing.*



6 *Case-hardened surfaces resist wear.*

7 *Micro-inch surface finish makes friction negligible.*

8 *Available in 5850 sizes.*

9 *Made from Timken fine alloy steel for long bearing life.*

10 *Tough inner core resists shock.*

OTHER tapered roller bearings may *look* like Timken® bearings. But there is no other tapered roller bearing which gives you as many important advantages as you get with Timken.

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Be sure that every tapered roller bearing *you* use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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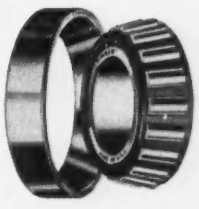
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ✳

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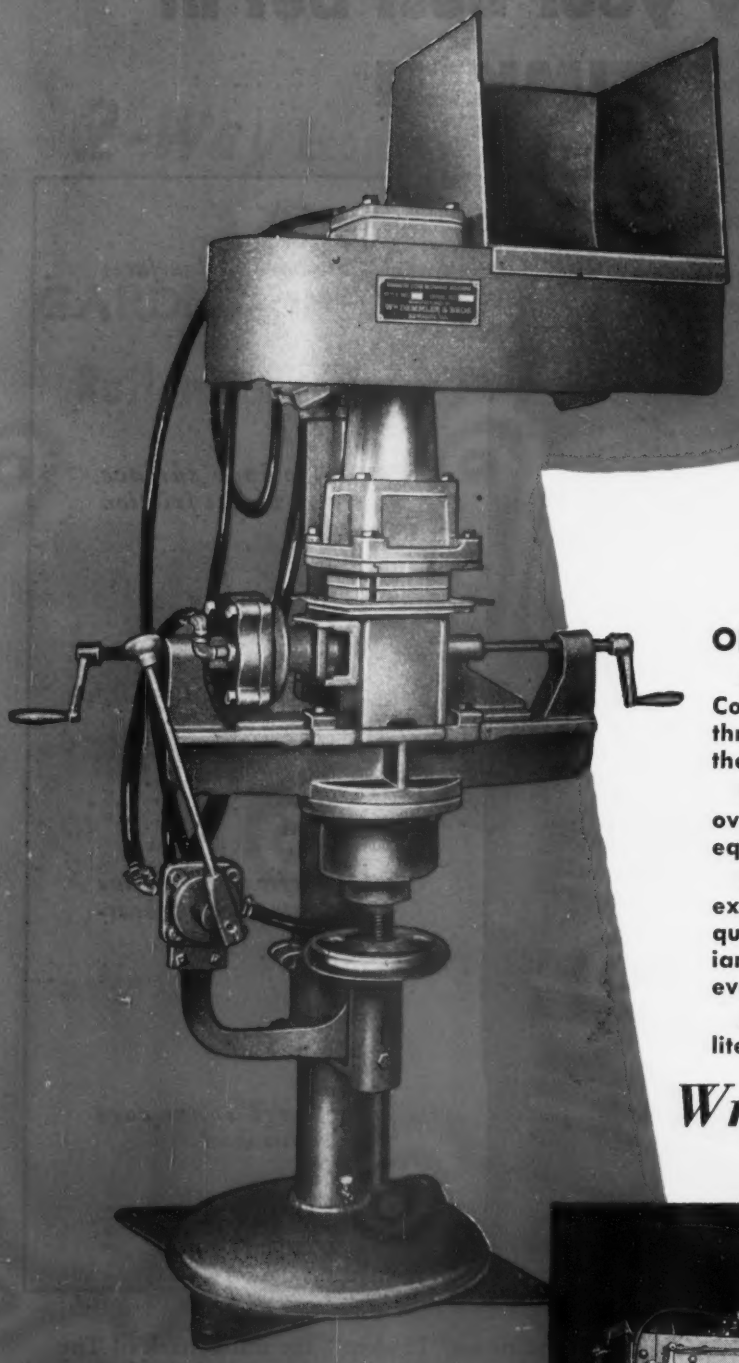

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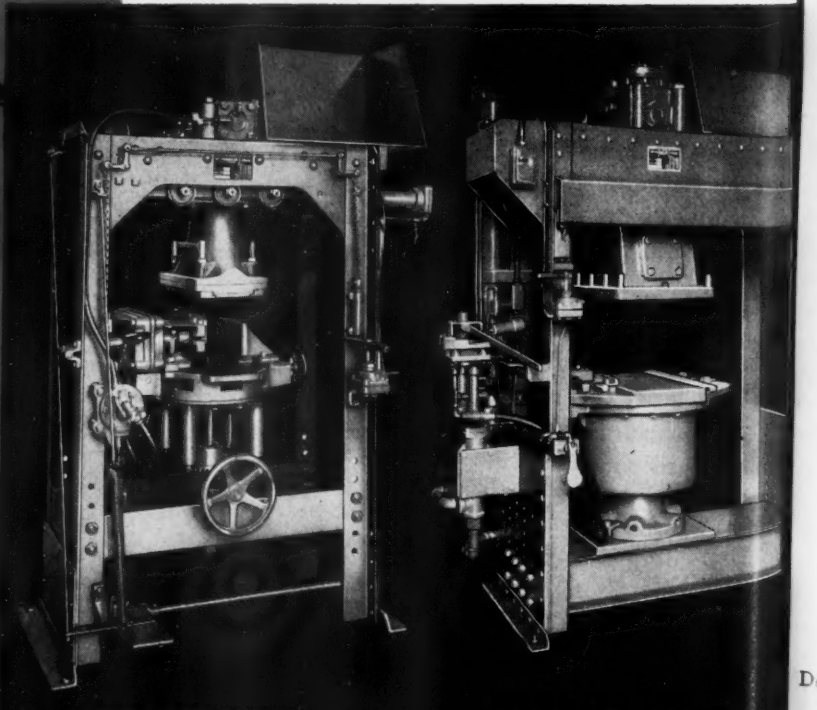
A letter stating your needs will bring descriptive literature promptly. Write today!

Wm.* DEMMLER *& Bros.
Kewanee, Illinois



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Kaiser Aluminum

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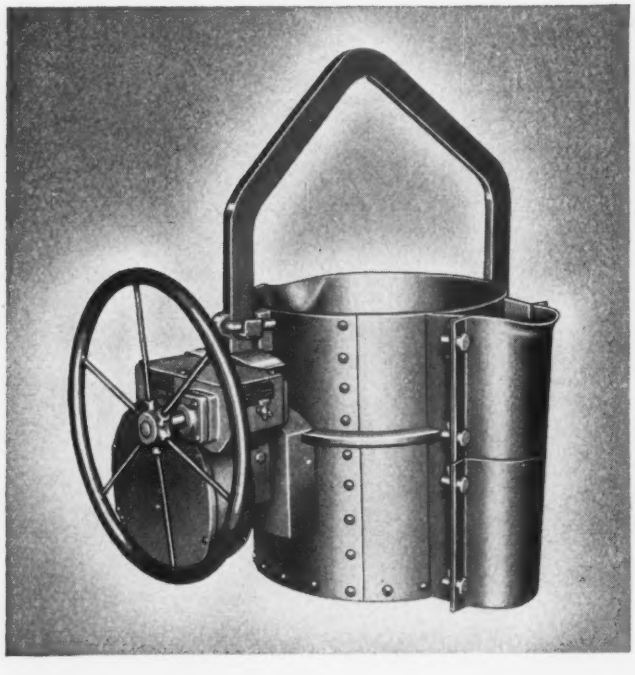

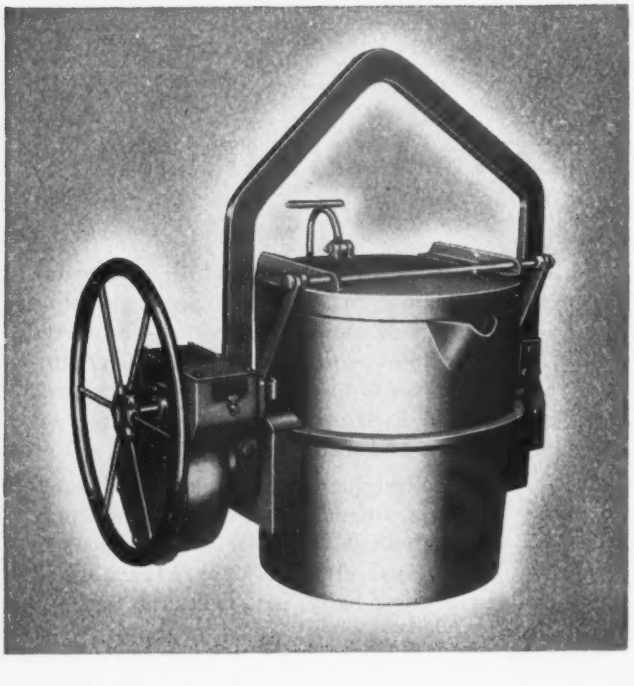

Industrial Equipment has all the ladles: teapot spout . . . covered . . . cylindrical . . . reservoir . . . buggy . . . bottom discharge . . . and many others, standard and special.

Each represents the last word in proven design and operating efficiency. All Industrial Crane Ladles are available with Industrial's revolutionary new universal bail which completely eliminates binding from heat or misalignment.

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EQUIPMENT COMPANY

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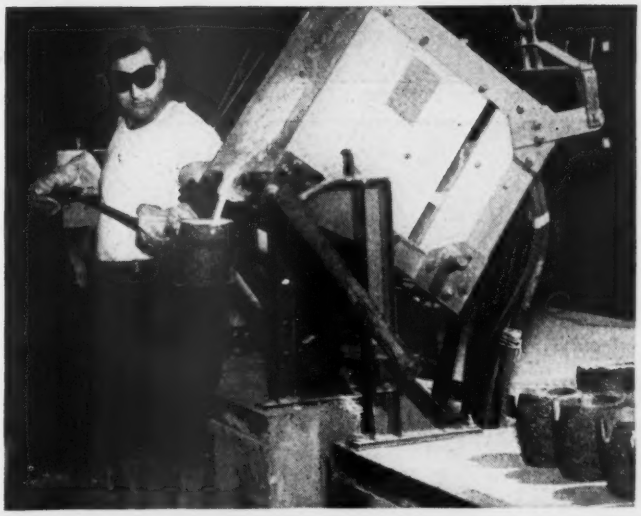

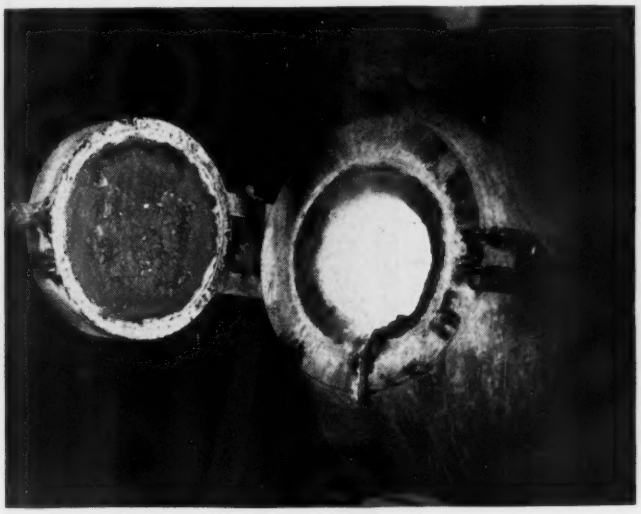

Norton CRYSTOLON RC1188 Offers Many Money-Saving Advantages*

In CRYSTOLON RC1188 you have a cement developed by Norton especially for lining crucible and reverberatory furnaces — and ladles — processing non-ferrous metals.

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GET THE WHOLE STORY

on CRYSTOLON RC1188 and other Norton refractory cements in this illustrated booklet, which includes a selection table covering the range of applications. Ask your Norton Representative for Form 863 or write to NORTON COMPANY, 310 New Bond Street, Worcester 6, Massachusetts.

NORTON FIRED SHAPES are available in the form of brick or segmental linings, in a variety of refractory materials for best results in non-ferrous metal-melting furnace applications. See your Norton Representative.

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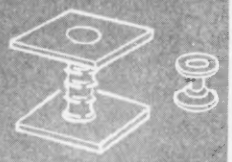
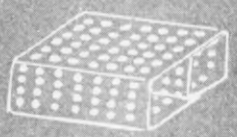
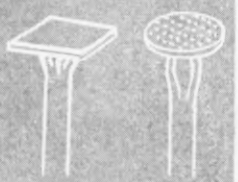
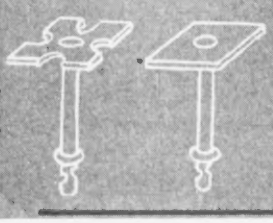
TYPE	CHARACTERISTICS	APPLICATIONS
MOTOR 	FUSE READILY STEMS CAN BE GROOVED HEADS CAN BE PERFORATED CLOSE TOLERANCES ± .002 HEADS CAN BE TILTED	*For Light Sections of* Motor Blocks • Heads • Housings Radiator Sections • Burner Sections • Pump Sections • Farm Equipment • Job Castings
BUTTON HEAD OR BOILER	STURDY STRUCTURE FUSE READILY STEMS CAN BE GROOVED NON SLIP BUTTON HEAD	*For Boiler Sections*
PERFORATED 	10 STANDARD SHAPES MADE TO FIT ALL CONTOURS MADE TO ALL RADII DESIGNED FOR WEDGES LOW IN COST	*For Light Sections of* Stove Castings • Motor Castings Job Castings
DOUBLE HEAD	STURDY STRUCTURE STRONG SUPPORT TO CORE CLOSE TOLERANCES ± .005 STEMS CAN BE GROOVED HEADS CAN BE CANTED	*For Heavy Sections of* Machine Tool Bases • Diesel Engines • Locomotive Frames Side Frames • Pumps • Road Machinery
SINGLE HEAD 	NON-SLIP FORGED HEADS FITTED HEADS WITH ANY RADIUS SOLID SUPPORT	*For Very Heavy Cores of* Diesel Engines • Machine Bases
RADIATOR	UNIFORM BREAK-OFF NICKS DEEP NICKS FOR FIRM KNITTING LOW COST	*For Radiator Sections*
SHOULDER RADIATOR 	EASY TO PLACE FUSE READILY DEEP BREAK-OFF NICKS STAGGERED NICKS FOR FIRM KNITTING UNIFORM SHOULDERS	*For All Thin Sections of* Manifolds • Stove Burners Cylinder Heads

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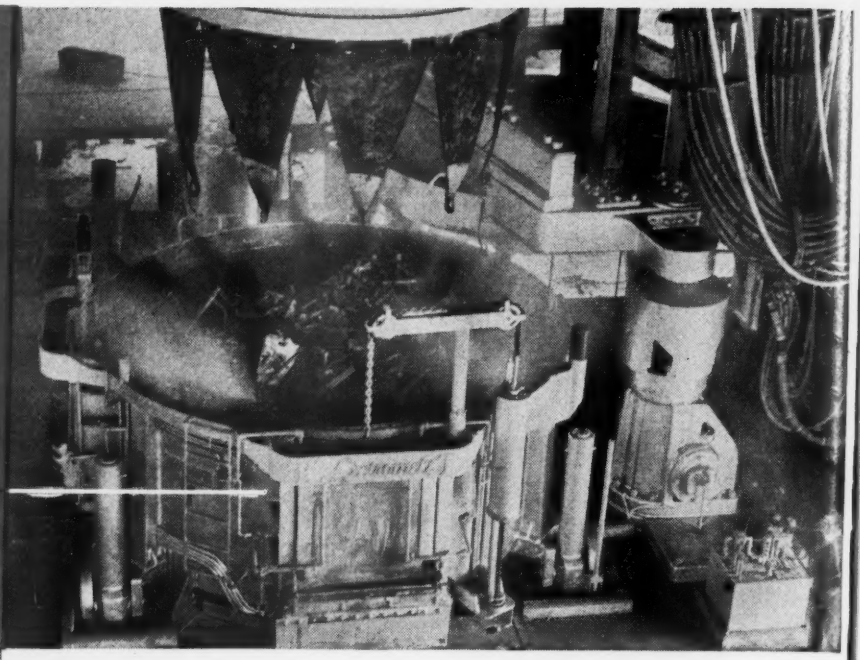

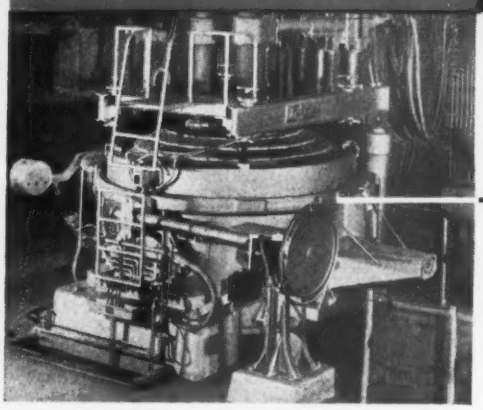

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LECTROMELT Builds Furnaces up to 150-ton Capacity

ALL WITH LABOR-SAVING, TOP-CHARGING DESIGN . . .

No matter what the size of your heats, Lectromelt builds a furnace to handle it—up to 150-ton heat capacity.

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Lectromelt furnaces offer you all these additional moneysaving advantages; engineered and correlated electric power system; counterbalanced electrode arms; oil-bearing-mounted top structure; side-mounted tilting mechanism.

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*REG. T. M. U. S. PAT. OFF.

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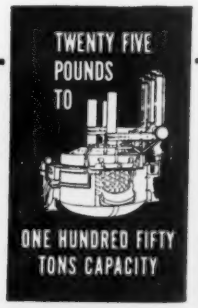
WHEN YOU MELT... *Lectromelt*



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Delta Special Core & Mold Wash Base — Used by more steel foundries than all other types of washes combined.

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FOR ALL TYPES OF SAND CAST METALS:

Delta ThermoKoat — It's plasti-lastic, non-heat shocking, highest fusion and hot strength.

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Delta BlacKoat — a black wash, free from carbon, no gas in contact with molten metal.

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Delta NonferrusKoat — produces unusually smooth surface castings.

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A special compound, not iron oxide. A high hot strength and sand plasticizing material. Stops veins and penetration.

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Eliminates Sea Coal Nuisance: The new modern scientific sea coal replacement.

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A new type of Dry Binder which provides new economies. Fast-baking, reduces veining and penetration. Can be used with old sand equally as well as with new sand.

BONDITE: Produces a reducing mold atmosphere:

For Steel and Gray Iron — Use Delta Bondite, a dry binder which becomes waterproof on drying and produces mold atmosphere which is high in reducing gas.

96-B SAND RELEASE AGENT:

Another Foundry *"First"* by Delta. By adding 8 oz. or less per ton to your core or molding sand mixes, your sands will flow freely. 96-B is completely volatile at elevated temperatures and does not contaminate the sand.

CORE ROD DIP OIL NO. 224X:

Ties core rods and wires into the cores:
Rods and wires coated with Delta Core Rod Dip Oil adhere to the sand. Eliminates need for 50% of the rods and wires and reduces core breakage.

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Sticking core sand mixes work freely in core boxes when sand conditioning oil is added to core sand mixers.

CORE OILS:

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DELTA OIL PRODUCTS CO.

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The Heat's On!

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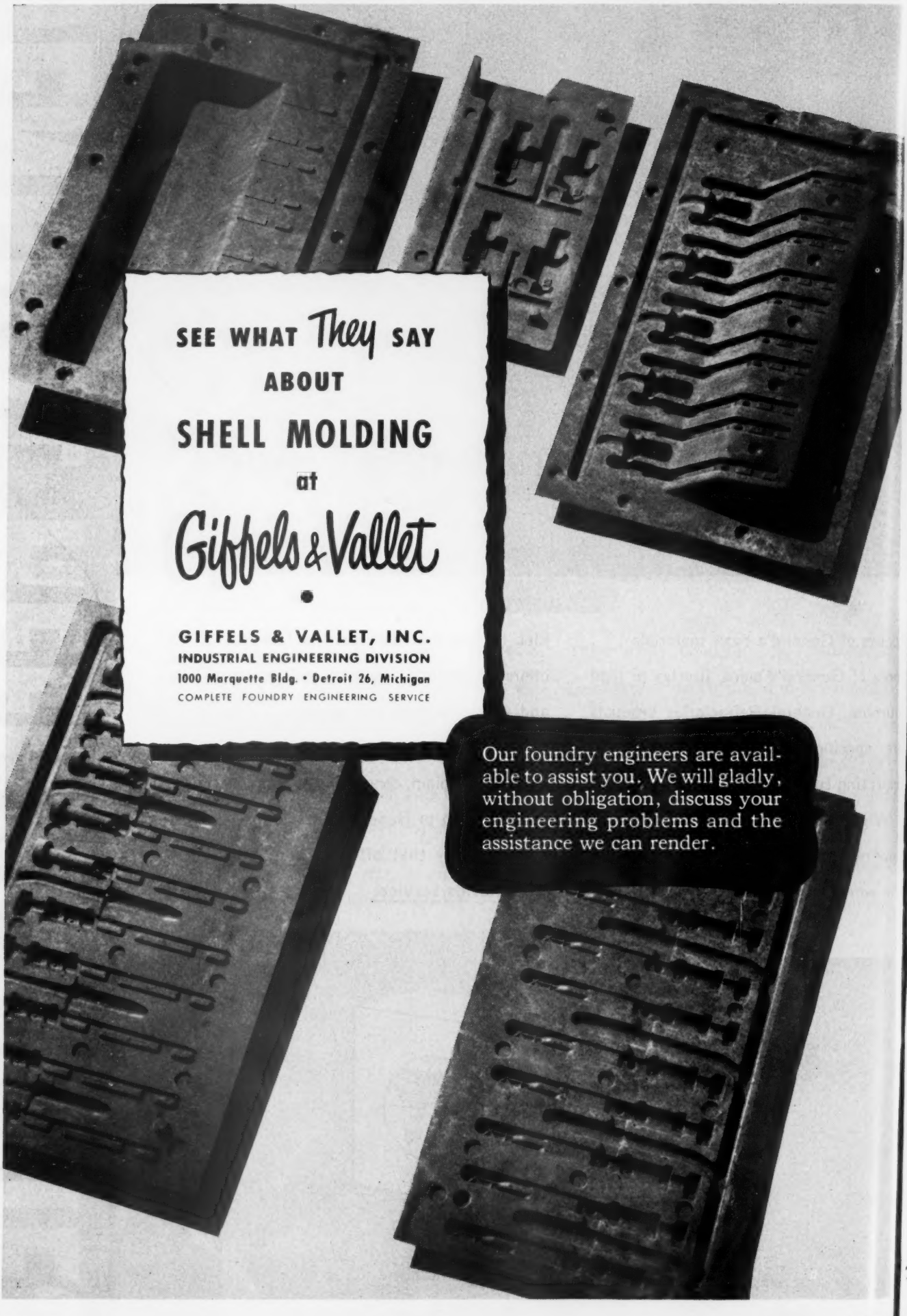
A Complete Refractories Service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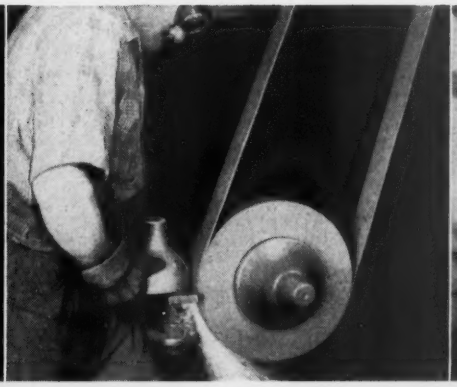
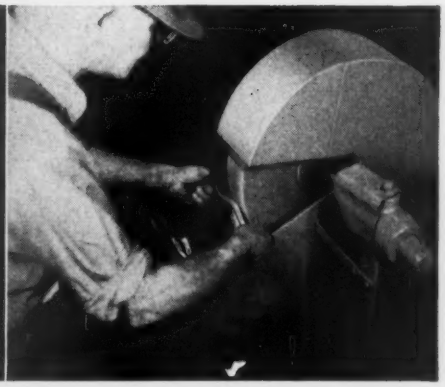
...improves Belt Performance!





You, too, can expect and get better performance plus up to twice the life from abrasive belts by CARBORUNDUM. Only one simple change in your present method is required. Use your same backstand grinder and abrasive belt, but install a serrated "61" Contact Wheel by CARBORUNDUM at the "business" end. CARBORUNDUM'S new "61" Contact Wheel provides higher rates of stock removal, extends productive life on the belt, as well. Belt glazing is virtually eliminated. Your CARBORUNDUM representative will give you full details, and will be glad to arrange an impartial production test.

Only CARBORUNDUM TRADE MARK

makes ALL Abrasive Products ...to give you the proper ONE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, N. Y.

82-151A

"Putting Mettle into Metals Since 1896"

BELMONT METALS

Metals are our business—and yours too! Today our common problem is the shortage of all metals—the pressure of the civilian economy and defence demands is more than available supply can stand . . . up to the minute "know how" and time tested experience is more important than ever.

Better than half century of service and growth in all periods—War, Peace, "National Emergencies"—have "experienced" Belmont to cope with the current perplexities and problems. When that shortage strikes—or you wish to compare the merits of a substitute—contact Belmont . . . No effort will be spared to add Belmont experience and "know how" to yours—and that "probable" bottleneck can be smashed before it becomes serious.

"Belmont Metal of the Month" letters include market trends, statistics, and other helpful data—write to receive your copy—with our compliments.

Belmont SMELTING & REFINING WORKS, INC.

302 BELMONT AVENUE, BROOKLYN 7, NEW YORK · Dickens 2-4900

Cut Core Handling Costs

with R-W "Zig-Zag"®

Continuous Power Conveyor

A ZIG-ZAG Conveyor installation in the plant of a manufacturer of plumbing fittings. Here the baked cores are being delivered from the ovens to the checking and gauging benches.

Engineered for Economy and Flexibility

- Horizontal and vertical units alternate in a continuous chain traveling through special steel tubing.
- Complete flexibility for installation in any plant. Easily installed, easily changeable to conform to plant alterations.
- SAFE—all moving parts are fully enclosed.
- Low first costs. Low Power Factor.
- Standard horizontal or vertical curves —two-foot radius.

Moving fragile cores by old-fashioned methods is always a ticklish business. A sudden bump or jerk and part of a day's production is lost forever! But with a ZIG-ZAG Continuous Power Conveyor to carry them overhead—smoothly and in perfect safety—the risk of core breakage due to handling mishaps is reduced to a minimum. ZIG-ZAG—a steel, tube-like track through which travels a specially constructed motor-driven chain—will carry unit loads up to 125 pounds at speeds ranging from 1 inch to 60 feet per minute. It's designed to go up and down, in and around "like water through a pipe." And ZIG-ZAG is flexible, too—if changes or relocation are required you can take it down here and put it up there, and in most cases, *use all the parts!*

* * *

Learn how patented ZIG-ZAG can save money in your core department. Send today for details—or better yet, have an R-W engineer consult with you at no obligation.

For descriptive catalog, address Dept. F

1880 RICHARDS WILCOX R-W AURORA TRADE MARK Reg. U. S. Pat. Off. 1951

OVER 71 YEARS

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

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SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT
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ELEVATOR DOOR OPERATING EQUIPMENT

NEW . . .
IMPROVED

HEAVY DUTY

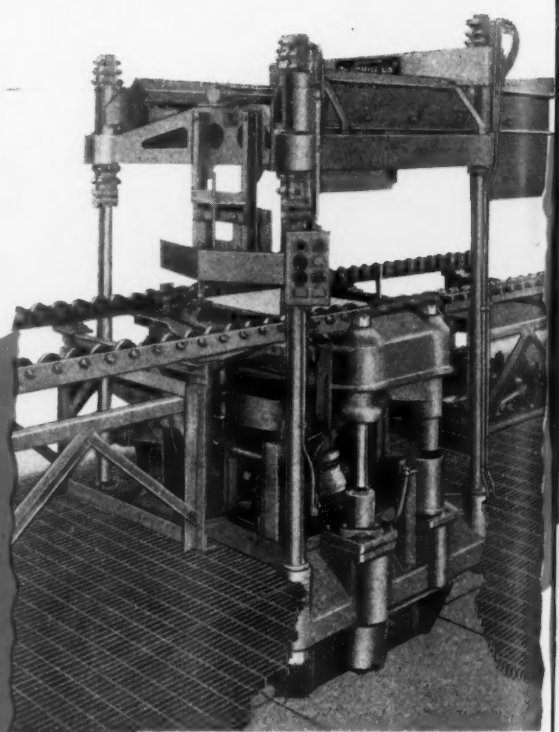
JOLT—SQUEEZE-

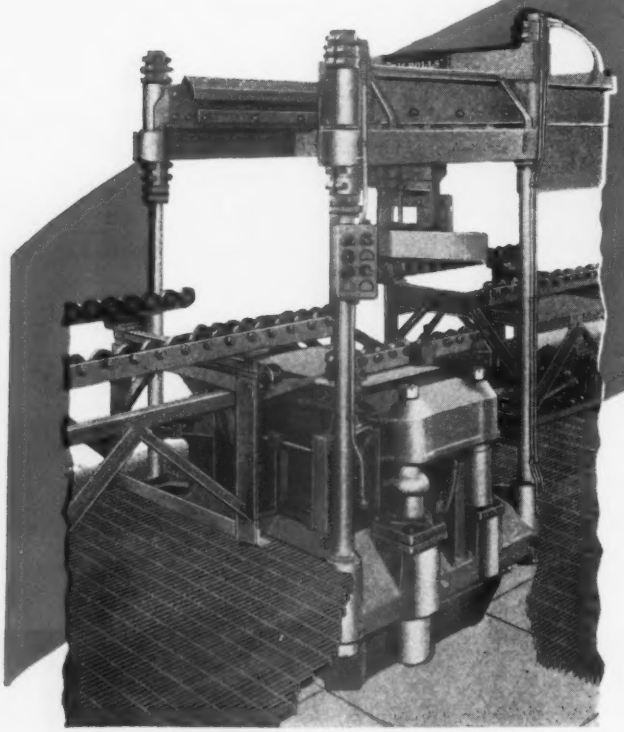
Equipped with "Safety"

for fully automati

Increase Production . . .
Lower Costs

With this #26 Type C fully automatically operated molding machine—This Jolt squeeze pattern draw machine is equipped with automatic devices enabling you to set for a predetermined number of Jolt strokes and predetermined squeezing time. Also equipped with automatic sand strike-off which also acts as a flask puller when mold is completed. Another feature is the flask roll-off device built into the machine.





The machine is now in squeezing position ready for the pattern draw.

Machine in position for jolting.

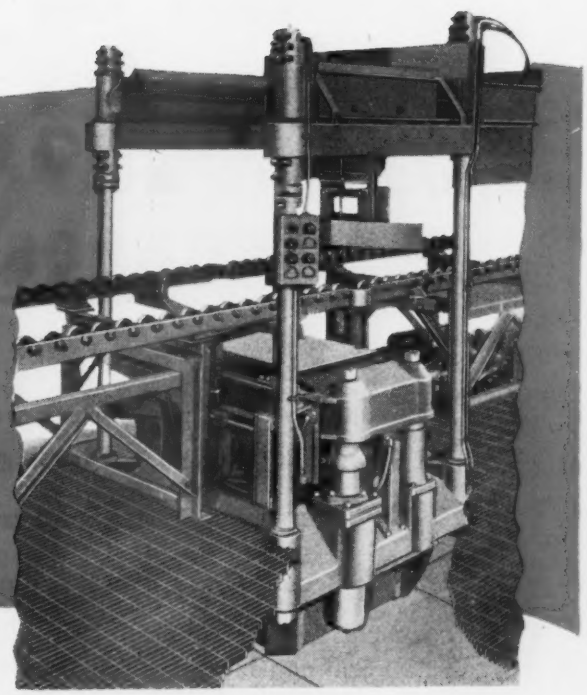
Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL 18, LONG ISLAND, NEW YORK

TY MOLDING MACHINES

ZE-nd PATTERN DRAW

ety' ush-Button Controls

nat peration



MAKES MOLDS in SECONDS

LOW UPKEEP

All draw pins and guide bushings are case hardened and ground to precision tolerances for perfect fit and smooth operation. An accurate system of gages and jigs provides interchangeability of parts for the same models.

The low upkeep records of hundreds of foundries attest for foresight of Nicholls' Engineers in designing inbuilt features that make for long life and accurate, dependable performance after years of service. As an instance, we point to the dirtproof housings and forced lubrication that are provided for all critical parts that might otherwise wear quickly and affect permanent alignment and satisfactory operation.

The international acceptance of large numbers of Nicholls' molding machines for many years is evidence of their productive capacity, combined with low upkeep and reliability.

Write for Literature

The pattern has been drawn, the pressure head returns to the out position and automatically pulls the finished mold onto the roller extension.

GUARANTEED WORKMANSHIP

Smooth sensitive operation is built into all moving parts of Nicholls molding machines by expert mechanics, skilled in their specialized tasks. Close tolerances assured by a system of accurate jigs and fixtures.

NICHOLLS

OUTSTANDING RESULTS WITH

TAM*

ZIRCONITE

ALL-PURPOSE PASTE WASH

● An outstanding advantage of TAM Zirconite paste wash is that any washing solution made from it can be used ***immediately after preparation.*** As a wash, it mixes readily and easily with water.

● Because of its high fusion point and other characteristics, Zirconite paste wash has proved to be an excellent material in both ferrous and non-ferrous usage where it assures a smooth casting surface.

● Multiple bonding agents provide increased resistance to settling ...enable wash to remain on core or mold without peeling, checking or spalling throughout baking or pouring operations.

Our field engineers will be glad to demonstrate the advantages of Zirconite paste wash or you may obtain complete information by writing our New York office. No obligation, of course.

TAM PRODUCTS
Registered * U. S. Pat. Off.

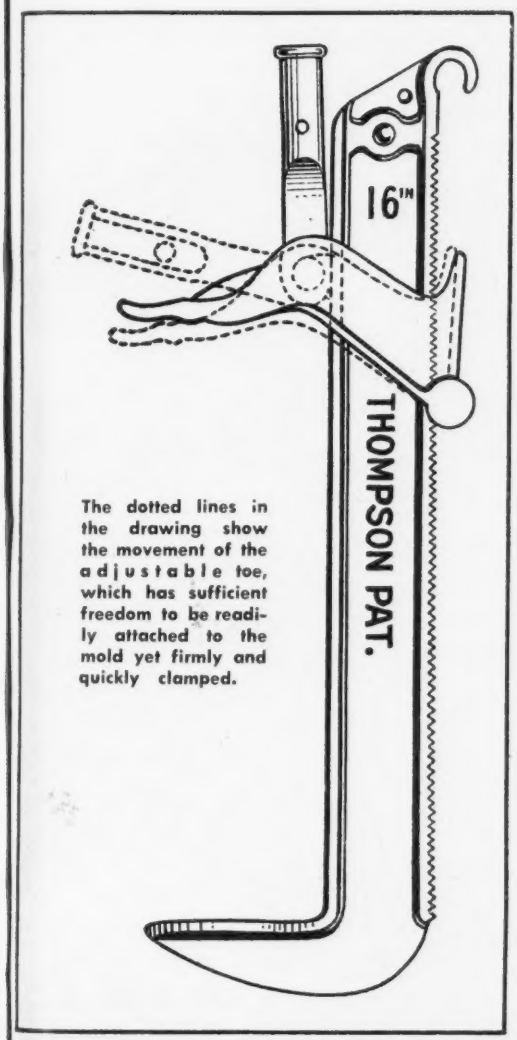
*TAM is a registered trademark.

TITANIUM ALLOY MFG. DIVISION
NATIONAL LEAD COMPANY
Executive and Sales Office: 111 BROADWAY, NEW YORK CITY · General Offices, Works, and Research Laboratories: NIAGARA FALLS, N.Y.

Obermayer—

invites you to try an outstanding

ADJUSTABLE FLASK CLAMP



The dotted lines in the drawing show the movement of the adjustable toe, which has sufficient freedom to be readily attached to the mold yet firmly and quickly clamped.

These practical, labor-saving, foundry clamps are the best to be found on the market. They are always ready for use, are instantly adjustable to your flasks and being of Super-Y Malleable Iron are practically indestructible. Thompson Clamps save your flask equipment and save molds because there is no jarring when applied as is the case when wedges are driven with clamps of other types. Thompson Clamps can be adjusted to wide ranges of size and for that reason provide substantial savings in original investment. They are easily stored by hanging with the hook on the main leg of the clamp and repair parts are quickly available from our Chicago warehouse.

For Further Information Write or Call Nearest Office Listed Below

Manufactured exclusively by:

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The **S. OBERMAYER** *Co.*

Everything you need in your Foundry

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"THE WHEELS OF INDUSTRY"
STERLING
GRINDING WHEELS
Plus
VALUE
ABRASIVE PRODUCTS
FOR
• BETTER GRINDIN
• FASTER GRINDIN
• LOW COST GRINDI
THE STERLING GRINDIN

"F" and "P" HIGH SPEED BONDS

PROVIDE A QUICKER SOLUTION FOR FOUNDRY GRINDING PROBLEMS

Two Sterling Foundry Grinding Wheel bonds, each a product of Sterling's Research and Development Program, satisfy all high-speed foundry grinding demands. These two resinoid bonds–"F" and "P"–are distinctly a Sterling idea. When either is used in a wheel in proper combination with various kinds of abrasive grains, wheel structures, and grades, it provides the best possible foundry grinding. Being "tailor-made" to meet special applications, these wheels do specific jobs better, faster, and at lower cost.

In concentrating their efforts on perfecting these two bonds, Sterling technicians eliminated most of the time needed to select the proper wheel for your job. "F" or "P" Bonds "fill the bill" where other wheels demand a wider bond choice – hence, need more planning time – for producing the proper abrasive unit for floor-stand or swing-frame grinding.

The unusual efficiency built into Sterling Foundry Grinding Wheels provides many desirable features for users of these "Wheels of Industry." Deliveries can be made from our plant to you much more rapidly . . decisions as to special wheel formulas can be more quickly determined . . you can order and reorder with confidence in identical formulas being maintained.

Sterling's ability to turn out quickly the precise grinding wheel you need is important, and will become more so as emergency production continues. Sterling engineers can make immediate time-saving decisions as to the correct wheels for the solution of your grinding problems. Our modern manufacturing processes mean rapid flow of your order through our plant. A letter from you will bring expert cooperation at no cost or obligation. Write us and we will follow through at a fast pace.

BEST IN THE TEST --- THAT'S STERLING

Exhaustive, competitive tests of Sterling Grinding Wheels are being held daily in leading foundries all over the country. Time after time, Sterling's "Wheels of Industry," because of faster, better, lower-cost grinding on high-speed portable, swing-frame, or floor-stand operations, eliminate all competition . . . lead the field!

Such test results are proof positive of Sterling's important contribution to breaking foundry production records . . . may we help you break records in your grinding departments?

Send For These STERLING Research and Development Folders . . . .

These interesting folders describe the importance to you of Sterling's Research and Development Program and outline various grinding specifications for different types of tools and the entire range of metals. Also included is the popular, informative book, "The Art and Science of Grinding." Write today for your set of these folders . . . no obligation whatever.

WHEEL DIVISION TIFFIN OHIO

GRINDING WHEEL INSTITUTE MEMBER

Swing to

SMITH L-O CORE OIL

Right here on this page the best that we can do is remind you to swing to Smith L-O Core Oil.* If you are not already one of the many users, we want you to try it under your own conditions . . . to know through action why it shows a superiority for easy workability with sand, fast and accurate baking, clean shake-out, and all-around uniformity.

The host of foundries that get consistently good results with Smith L-O help validate our claims. Order your supply from the representative nearest you.

**The only core oil that is Dow-Therm processed.*

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Smith L-O Core Oil

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SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS

INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

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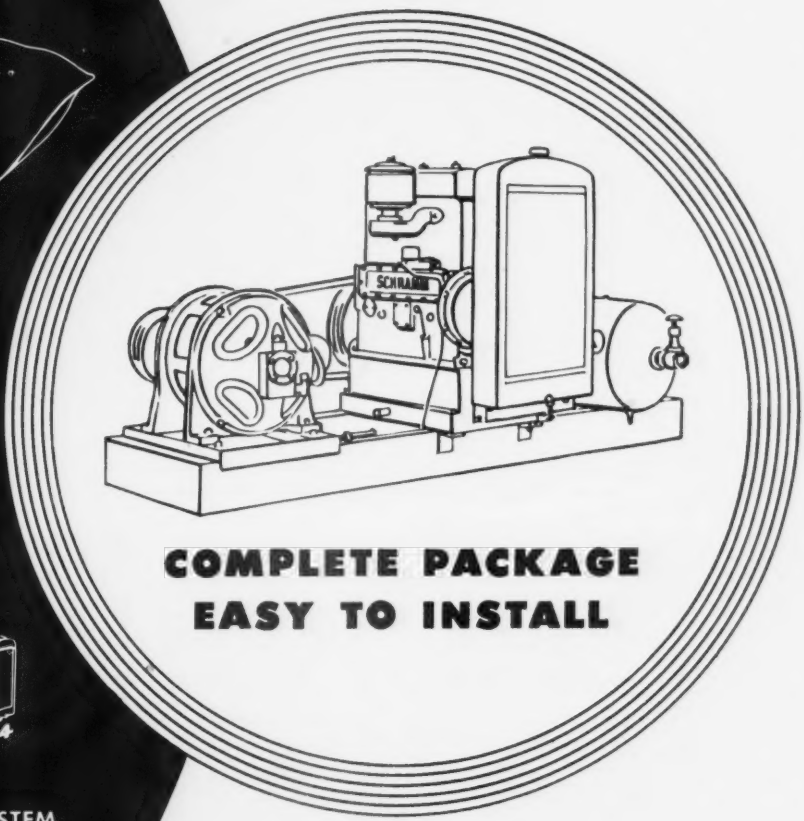
STATIONARY COMPRESSORS

For over a half century SCHRAMM INC., has devoted its entire resources exclusively to the manufacture of air compressors. This background and experience is reflected in the complete package featured here.

In addition to furnishing the size compressor, the correct type drive and mounting to fill every industrial requirement, you can also get all of the necessary accessories for a complete installation. Available in a compact package, easy to install and capable of furnishing 24-hour continuous service.

Built in sizes ranging from ⅓ to 100 horsepower.

Write for Booklet C-50B.



COMPLETE PACKAGE
EASY TO INSTALL

SCHRAMM INC.

The Compressor People

WEST CHESTER, PENNSYLVANIA

SCHRAMM, INC., WEST CHESTER, PA.

Please send Free Booklet C-50B on installing Stationary Air Compressors.

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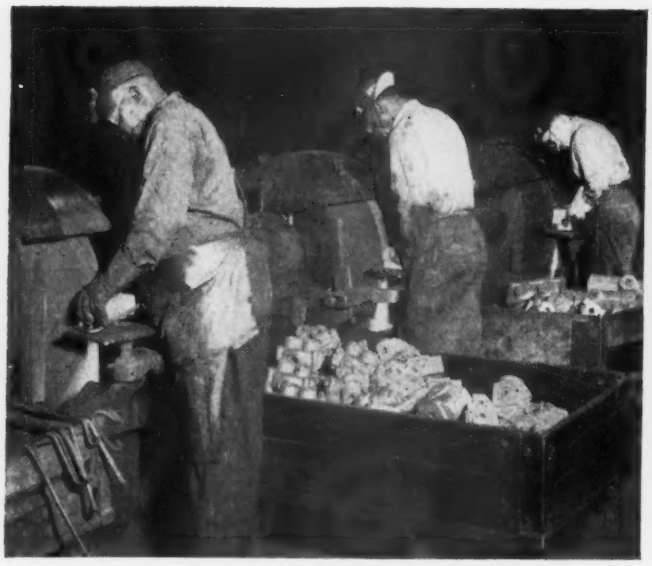
Long Lasting,

GET THE RIGHT WHEEL! That's the key to fast, economical grinding. And for every snagging job you do there's a Norton wheel that's *exactly right* — in size, type, abrasive, bond, hardness and structure. But don't let guesswork steer you wrong. Your Norton distributor and Norton abrasive engineer are always available to study your grinding applications. You'll find their suggestions point the way to sure savings in time and money.



DOUBLING UP ON EFFICIENCY . . . With Norton wheels on both ends of your floor or bench stand, you're twice as sure of top performance. Norton has the right combination of abrasive and bond to produce the most satisfactory results on all types of off-hand grinding.

ECONOMY THAT GOES PLACES . . . Keeping pace with the rapidly growing use of portable grinding machines, Norton makes wheels of every type and size for portable applications, from snagging rough castings — to working intricate dies. For general rough grinding, Norton ALUNDUM* or CRYSTOLON* wheels provide fast cutting action and long service life.

GRINDING WHEEL INSTITUTE MEMBER

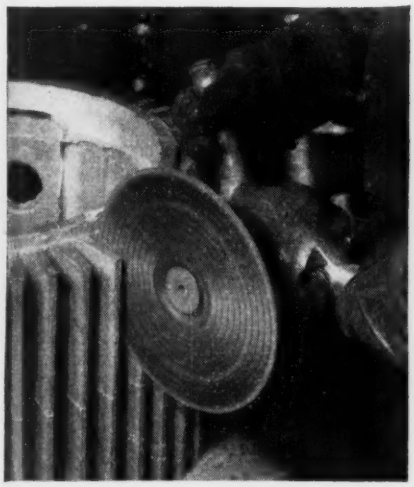
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

Making better products to make

Fast Cutting, Cost Cutting Performance On Every Rough Grinding Job!

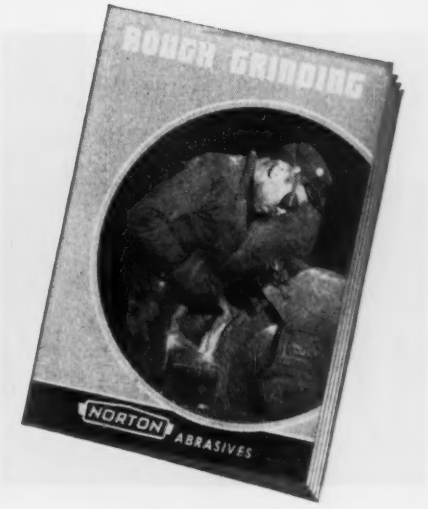
FAST WORK IN THE CORNERS . . . If a straight wheel won't do, there's sure to be a Norton cone, cup, plug or mounted point that fits in those hard-to-get-at places. And the standard shapes will take care of just about any situation.

TOPS FOR SAFETY . . . For speed in removing gates and risers from non-ferrous castings, use NORFLEX* reinforced resinoid cut-off wheels. They are equally effective for light snagging and slotting. The sturdy, flexible fabric structure withstands side-grinding, twisting, and bending without breakage.



ALL AROUND THE SHOP . . . Never before have so many users done so many jobs with a single wheel! Norton *Reinforced* Hub Wheels will rough or finish the surface, notch risers on ferrous castings, cut down and smooth up weld beads, do many other jobs. And their strong fabric reinforcement means 2 to 5 times longer wheel life.

ROUGH AND TOUGH . . . Norton's big, high speed wheels cut down the time and labor of heavy-duty swing-frame snagging. Use ALUNDUM wheels for metals of high tensile strength, CRYSTOLON wheels for metals of low tensile strength, in resinoid bonds for both abrasives.



Can YOU Answer These Questions?

What are the three types of bonds commonly used in wheels for portable grinders?

When should you use organic bonded wheels in preference to vitrified bonded?

How does the pressure exerted between wheel and work affect the choice of grade?

What special precautions are needed when grinding magnesium?

How can discoloration be avoided when roughing down stainless steel?

These questions and many more are answered in our illustrated booklet "*Rough Grinding*" (FORM 1405). It contains a lot of facts you need to know — facts which add up to better grinding at lower cost. Get it from your Norton distributor or representative, or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities.

other products better

NORTON
ABRASIVES

STUDEBAKER

INCREASES MELT BY

100%

To meet an increased demand for castings, Studebaker Corp., South Bend, Ind., recently modernized its foundry *. . . and doubled capacity without suspending operations.*

Partly responsible for this increased output is the efficient Whiting Make-up and Charging System and the six Whiting Cupolas. All operations for making up, including raw materials handling, weighing and transportation to the cupolas, are accomplished in 3 to 4 minutes per charge. Metal charges are placed into Whiting Cone-Bottom Buckets which are carried on Whiting Transfer Cars to inclined roller conveyors. The buckets then advance to the charging well and are hoisted to the charging floor by a Whiting Gantry Crane. This crane is then aligned with one of the three operating cupolas and moves the bucket into the cupola.

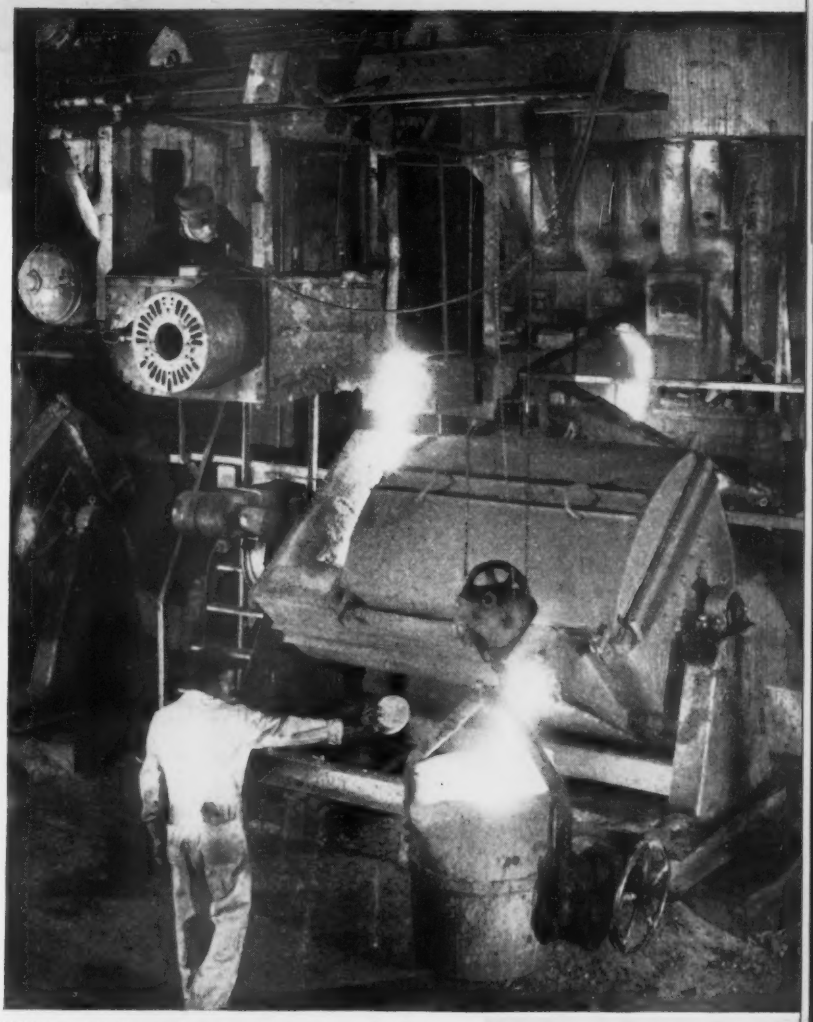
The six No. 9½ Whiting Cupolas are connected to blowers in pairs to be run on alternate days for two eight-hour shifts. Blast air is supplied by centrifugal blowers. Each cupola is served by a Whiting Reservoir Ladle.

Full appreciation of this system can be realized by seeing it in operation or by reading the entire sequence of operations. The detailed story of make-up, charging and cupola operation is told in the Fall issue of THE WHITING FOUNDER.

the WHITING Foundry Line

Cupolas • Cupola Spark Suppressors • Cupola Hot Blast Equipment • Cupola Moisture Control Equipment • Cupola Charging Systems • Cupola Coke Igniters • Cradle Furnaces • Converters (Steel) • Duplex Melting Systems • Air Furnaces • Electric Melting Furnaces • Ladles • Ladle Handlers • Wet-type Dust Suppressors • Tumbling Mills • Annealing Ovens and Cars • Pulverizers • Pulverized Coal Firing Systems • Turntables • *Materials Handling Equipment:* Trackmobile • Trambeam Overhead Handling Systems • Electric Chain Hoists • Overhead Cranes.

Weighed metal charge is dropped into a Whiting Cone-Bottom Cupola Charging Bucket carried on a Whiting Transfer Car. Weighed coke and stone charges are added as the bucket proceeds to the cupolas.



GREATER EFFICIENCY WITH

WHITING

... CUPOLAS
... CHARGING EQUIPMENT
... TRANSFER CARS
... LADLES

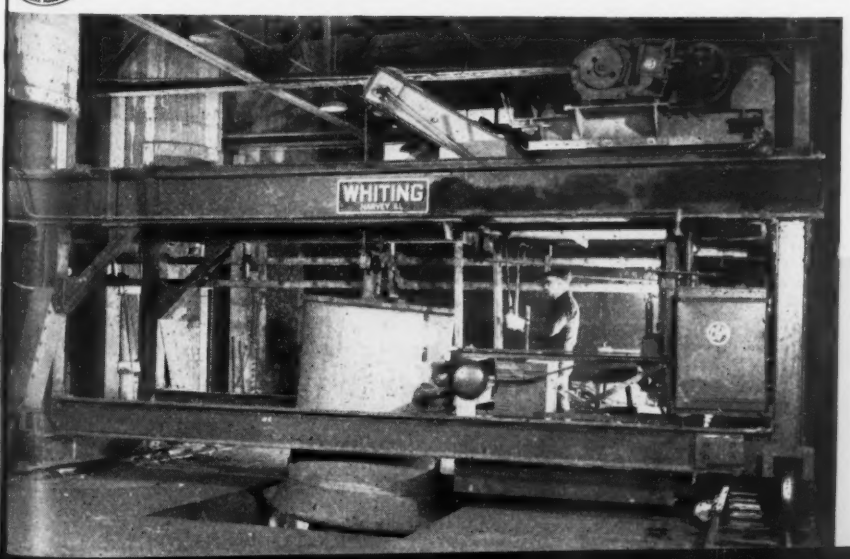
Whiting U-shaped, covered, motor tilted mixing ladles of 10,000 lb. capacity are mounted at each of six Whiting cupolas. Tilting is controlled by the hot metal carrier operator.

READ THE ENTIRE STUDEBAKER STORY!

The WHITING FOUNDER, Fall number, tells all about the interesting make-up and charging system at Studebaker. You'll also read about the successful experience with Whiting Cone-Bottom Charging Buckets and specific information on the operation of the cupolas. Write today—just say "Send me the Studebaker Story!"

FEMA

WHITING CORPORATION 15607 Lathrop Ave., Harvey, Illinois



This Whiting Gantry Crane raises a loaded Whiting Cone-Bottom Bucket from below to the charging floor and then by its extended trolley boom, moves the bucket into any one of the six cupolas.

THIS MONTH, 62,562* BUYERS OF CASTINGS WILL READ THIS AD...

This is one of a series of 6 full page ads emphasizing the expanding industrial acceptance of Brass Castings. Nationally circulated in outstanding trade journals and read by manufacturers, engineers, contractors, metallurgists, production control men—*these messages reach the men who specify and influence the purchasing of castings!*

R. Lavin & Sons, Inc.

AUTOMOTIVE ENGINEERS SPECIFY...
Bronze
Bushings
Where
Strength
And wear
Resistance
Are
Required
Bronze bearing metals with their high percentage of lead have the plasticity necessary to permit compensation for a slight want of fit or alignment of the bearing.
Tin in bearing bronzes insures strength and wear resistance, which coupled with the plasticity imparted by lead, makes bronze the satisfactory and dependable material for bearings, bushings and related applications in the automotive industry.
Specify—LAVIN NON-FERROUS INGOT—Quality
R. LAVIN & SONS, INC.
Refiners of Brass, Bronze and Aluminum
3426 SOUTH KEDZIE AVENUE · CHICAGO 23, ILLINOIS
REPRESENTATIVES IN PRINCIPAL CITIES
The Foundryman's Problems . . .
Are Our Problems!

* Audited Circulation plus pass-on readership.

REPRINTS OF ENTIRE *Brass Castings* SERIES ARE YOURS FOR THE ASKING

How to Improve Parting at any Foundry Temperature

Use **"dag"** colloidal graphite dispersions. They work at any temperature to be met in the foundry . . . even up to 5000° F. in inert atmospheres.

Colloidal graphite, when applied to molds, chills and patterns, produces an unusually slippery dry film because of its peculiar arrangement of atoms. Parting is made easy and the film is so thin that critical casting tolerances are not affected at all.

Molds and patterns so treated give superior reproduction and smoother casting surfaces. Less finishing is required, often none at all. Rejects are fewer and inspection takes less time. Mold life is lengthened.

"Dag" dispersions can be used, too, for lubrication of flask pins, shoulder screws and push pins. They eliminate binding and stripping, an important saving in time and money.

"Dag" water dispersions also eliminate or reduce the choking fumes and smoke usually caused by conventional petroleum-base parting compounds, thus improving shop conditions.

The use of **"dag"** colloidal graphite in the foundry is explained fully in a new bulletin that is available without obligation. Write today to Acheson Colloids Corporation, Port Huron, Michigan, for your copy of Bulletin #425-14M.

dag
DISPERSIONS®

Acheson Colloids Corporation

Port Huron, Michigan

. . . also Acheson Colloids Limited, London, England

Are you SURE that only one alloy will do the job?

Metal shortages often force an answer to that question. Yet it's a rare job indeed which only a single non-ferrous alloy will serve!

Many Federated customers, caught between an established practice on one hand and a shortage on the other, have got themselves off the hook with the help of their Federated salesman.

He gets help from headquarters in the form of answers from Federated metallurgists, who have one big question to answer in times of shortage:

What can this foundryman use in place of his old standby?

Sometimes the new recommendations work out better than the old . . . Herculoy* silicon bronzes in place of high tin bronzes, for example.

Federated is solving this problem daily for foundries large and small throughout the country. Some foundrymen are asking for such recommendations *before* they really need them, and making test runs on the newly recommended and more abundant alloy.

If Federated can help you in this way, ask the Federated salesman. He's your representative in Federated's organization.

*Registered trademark of Revere Copper and Brass, Inc.

Federated Metals Division

Federated first in the non ferrous field FMD

AMERICAN SMELTING AND REFINING COMPANY • 120 BROADWAY, NEW YORK 5, N. Y.

SLY TUMBLING MILLS

THE STANDARD OF STURDINESS

The SLY name on your Tumbling Mills has been the Standard of Sturdiness for many years.

Modern Design Throughout

Anti-Friction Bearings — Direct Motor Drive

Sturdy Construction for

Long Life — Low Maintenance

SLY TUMBLING MILLS
Can be Furnished as Follows:

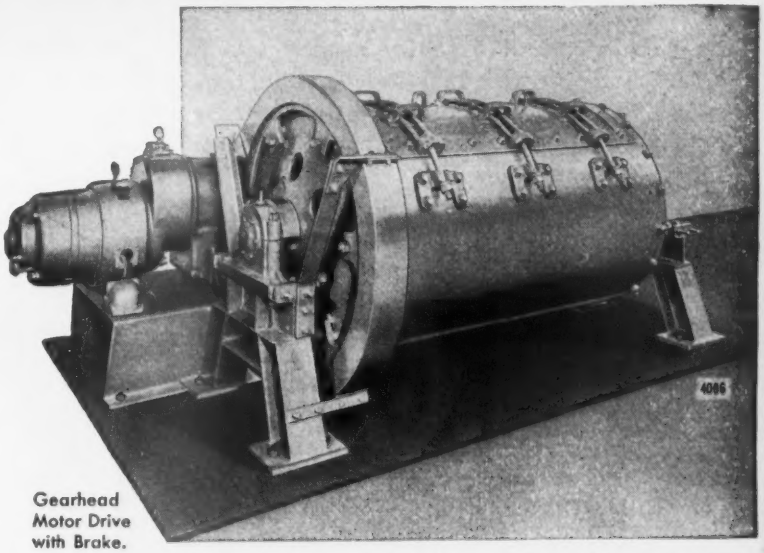
Inside diameters: 24″, 30″, 36″, 42″, and 48″.
Inside length from 36″ up.

Special Designs for

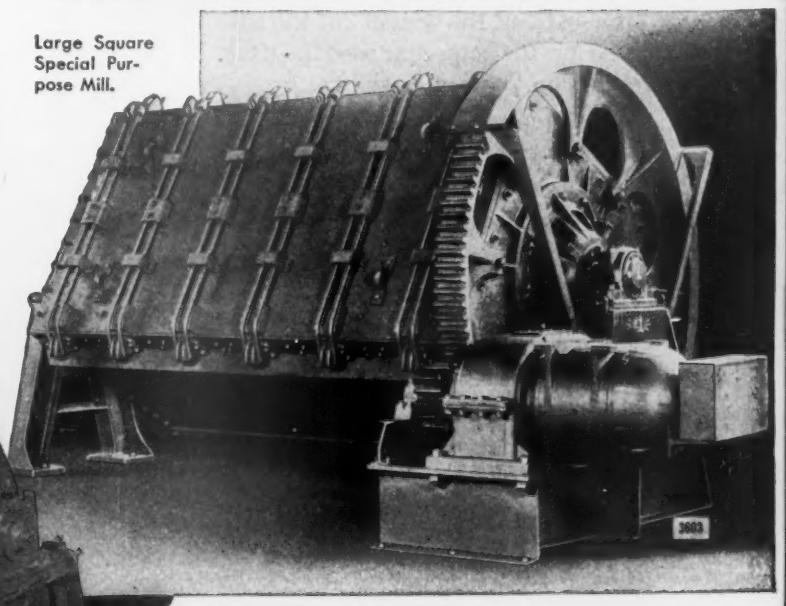
Stove Plate	Sprue Cleaning
Soil Pipe	Welding Rods
Waterpipe Fittings	Cast Anchor Chain

Drives for Mills

For greatest flexibility we recommend individual direct motor drive, but mills can also be furnished with V-belt drive, or tight and loose pulley for flat belt drive.



Gearhead Motor Drive with Brake.



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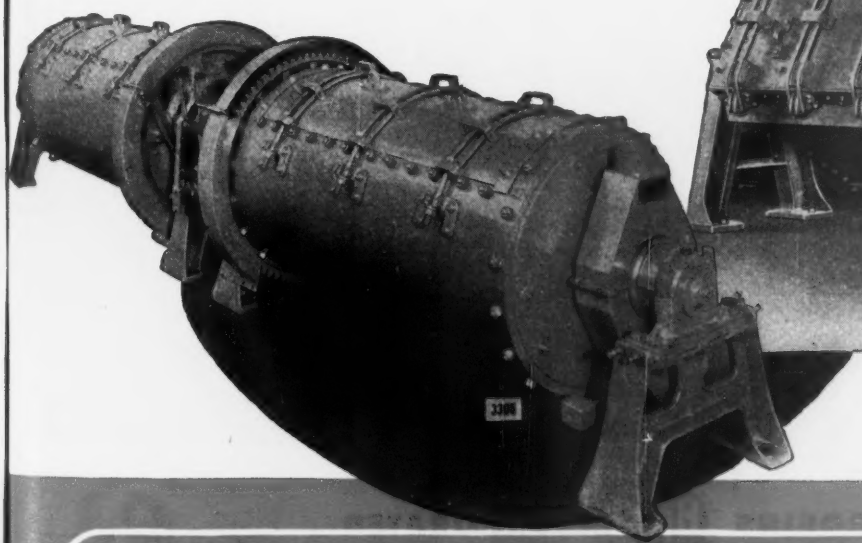

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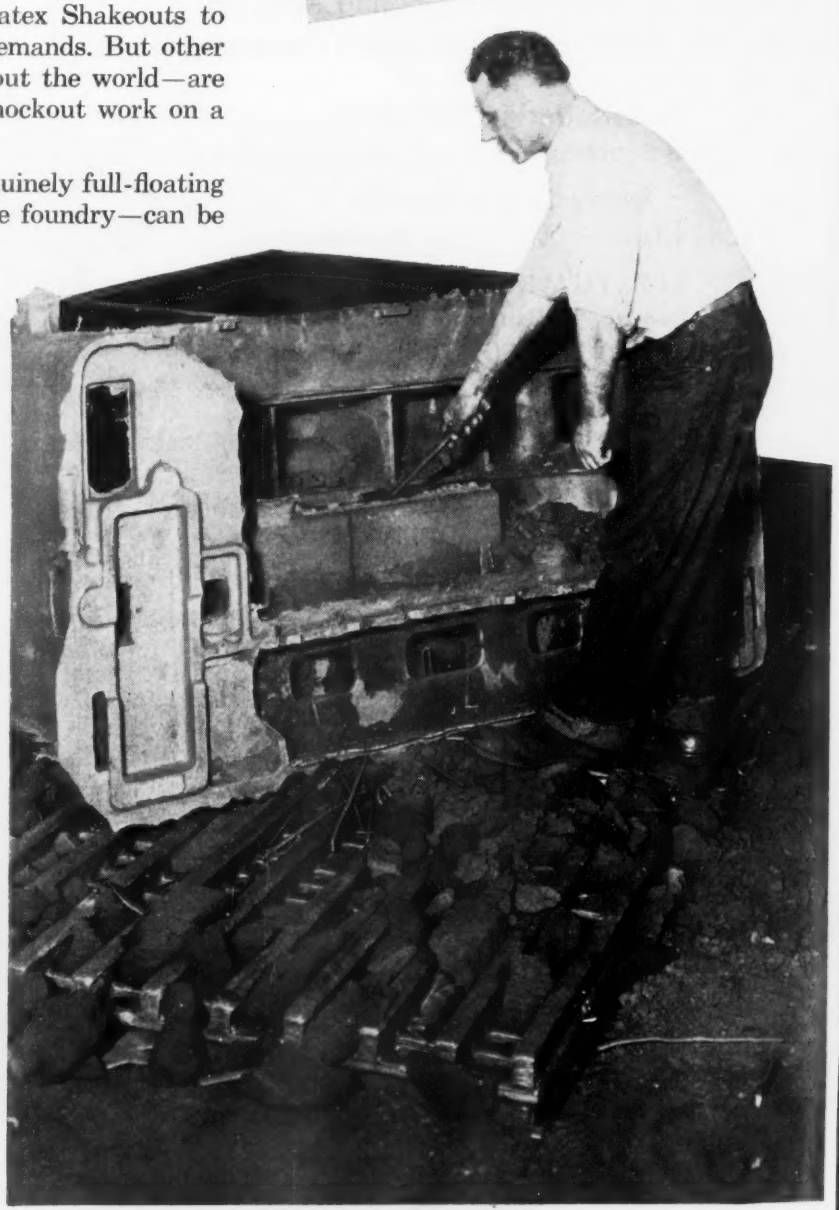

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HEADQUARTERS FOR SCALES

Readers' COMMENT

Nickel-Silver Railings

TO THE EDITORS:

We have noted on page 92 of the November, 1951 issue of FOUNDRY a photograph of nickel-silver stair railings in the Netherland Plaza Hotel, Cincinnati.

These railings were made by us as part of a complete installation of cast and wrought bronze and nickel silver work in the Carew Tower and adjoining Netherland Plaza Hotel. The installation comprises railings, grilles, gates, doors, storefronts and lighting fixtures, and it has been termed one of the very largest and certainly the most elaborate installation of nickel-silver architectural work in the United States.

W. N. MACKEY
Sales Manager

Newman Bros. Inc.
660-670 *West Fourth St.*
Cincinnati 3

* * *

Old But Not Obsolete

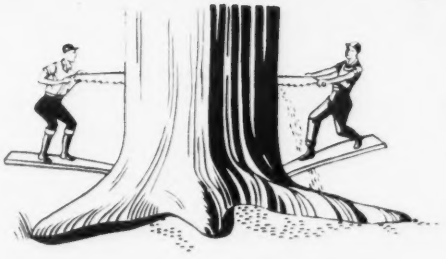
TO THE EDITORS:

Some time back on the page devoted to "Reader's Comment," a mildly indignant foundryman protested the presentation of articles dealing with old-time foundry practice. For example, he claims that information on patternmaking and molding technique employed to produce cast gear wheels is obsolete. In my opinion, based on over a half century of foundry experience, basic information on cast gear wheels may be old, but it is by no means obsolete.

The wheel, the lever and the wedge trace their ancestry to a period where history is lost in the nebulous mists of tradition and antiquity, but the same basic mechanical factors find universal acceptance today. Two thousand years ago a nimble-minded nonferrous foundryman invented a method of joining component parts of a bronze statue instead of attempting to cast the object as a single unit. The item, known as a "roman joint" is still practiced today, because it is the perfect solution of a difficult problem. Basic information on any subject may be old, but it is a very good foundation for modern thinking and development.

Occasionally a young mechanical

(*Concluded on page* 88)



Lumber Company proves Metal Workers right

..."it takes a TOUGH Conveyor Belt to haul a tough load!!!"

Mounting labor costs and shortages of local workers caused a large Southern Lumber Company to install conveyor belts for unloading lumber.

The idea worked fine. Several carloads could be unloaded simultaneously on the belts with minimum effort, handling costs were reduced and a confused traffic situation was eased.

But, ordinary conveyor belts couldn't stand the pace! Rough oak planks gouged off sections of belt covers and weather made deep inroads through the cuts, causing carcass deterioration and premature belt failures.

A local Republic Distributor, called in for advice, quickly solved the problem by recommending use of Republic Record Maker—a conveyor belt with tough rubber exterior and a rugged, mildew-resistant carcass . . . a belt widely used in the metal working industries.

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You'll achieve similar success with Industrial Rubber Products only if the products are properly applied to the job. Take advantage of Republic Rubber's free service offering to have a complete analysis made of your requirements. Write us today. Whether it's Conveyor Belting, Transmission Belting, Hose or Packing—there's no substitute for the best!

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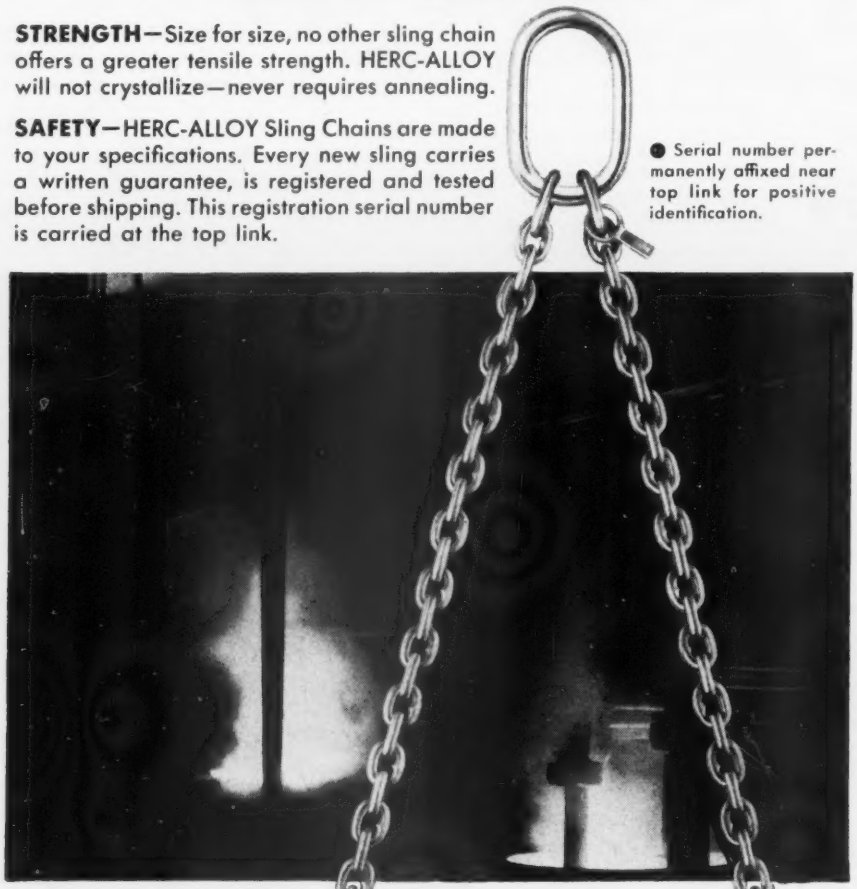

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(Concluded from page 86)

genius springs into the arena fully armed like Jove. The vast majority have to serve a more or less arduous apprenticeship where experience is gained through a study of what has been accomplished by early pioneers and explorers.

OLD TIME FOUNDRYMAN

* * *

Glossary of Foundry Terms

TO THE EDITORS:

In the new issue of FOUNDRY, you reprinted a letter from a reader in Chile. This reader asked about "Yankee Words," and an editor's note said that a limited supply of "Glossary of Foundry Terms" is available to readers.

I am a circuit teacher in the field of foundry and all the schools at which I teach do subscribe to your magazine. If it is possible, I would like to have one copy of this glossary in each school at which I teach. If this is not possible, please send one copy to this school. A list of the vocational and adult schools follows: Beloit, Fond du Lac, Oshkosh, Kenosha, Waukesha, South Milwaukee, Racine and Green Bay.

The appearance of a new issue of FOUNDRY in the classroom is a high point for the apprentices, who read it in extra time at school and take it home for a week at a time. Your latest series of special articles in the nonferrous field have been especially well received.

ROBERT SPEERBRECHER
Foundry Instructor
The Vocational and Adult School
Beloit, Wis.

* * *

Selling Engineering Education

TO THE EDITORS:

A deep bow to you on the editorial in the October issue of FOUNDRY.

Engineering education always has to be sold, strangely enough. And the selling is always done better by an outsider. When we talk up engineering education ourselves, we encounter the skeptics who point out that we are merely selling our wares.

I believe that the Foundry Educational Foundation is the only industry-wide educational project in the United States, and is an immense credit to the foundrymen who have always been looked upon as just a little backward in the business of sustaining American higher education in engineering.

C. J. FREUND
Dean
University of Detroit
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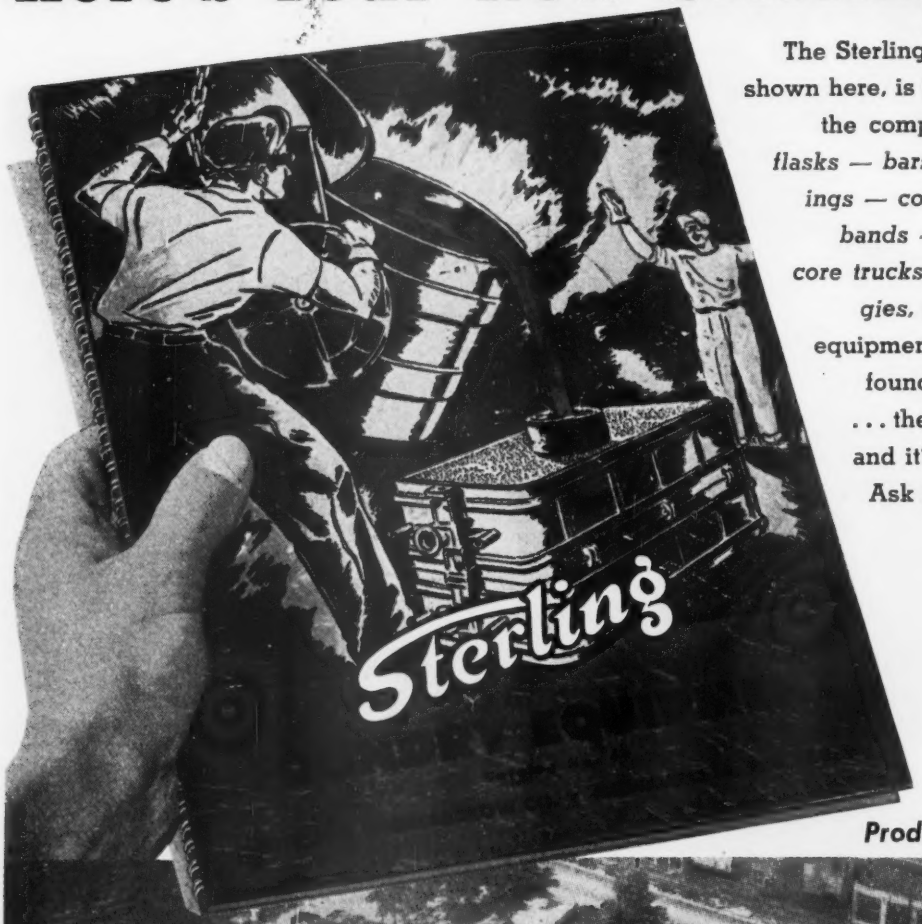

The Sterling Foundry Equipment Catalog, shown here, is just off the press. It describes the complete Sterling line of foundry *flasks — bars — clamps — pins and bushings — core plates — bottom boards — bands — upsets — wheelbarrows — core trucks — casting carts — slag buggies,* etc. This dependable Sterling equipment is preferred by thousands of foundrymen. It's built for long life . . . the finest that money can buy — and it's certainly *worth waiting for.* Ask for copy of this new catalog.

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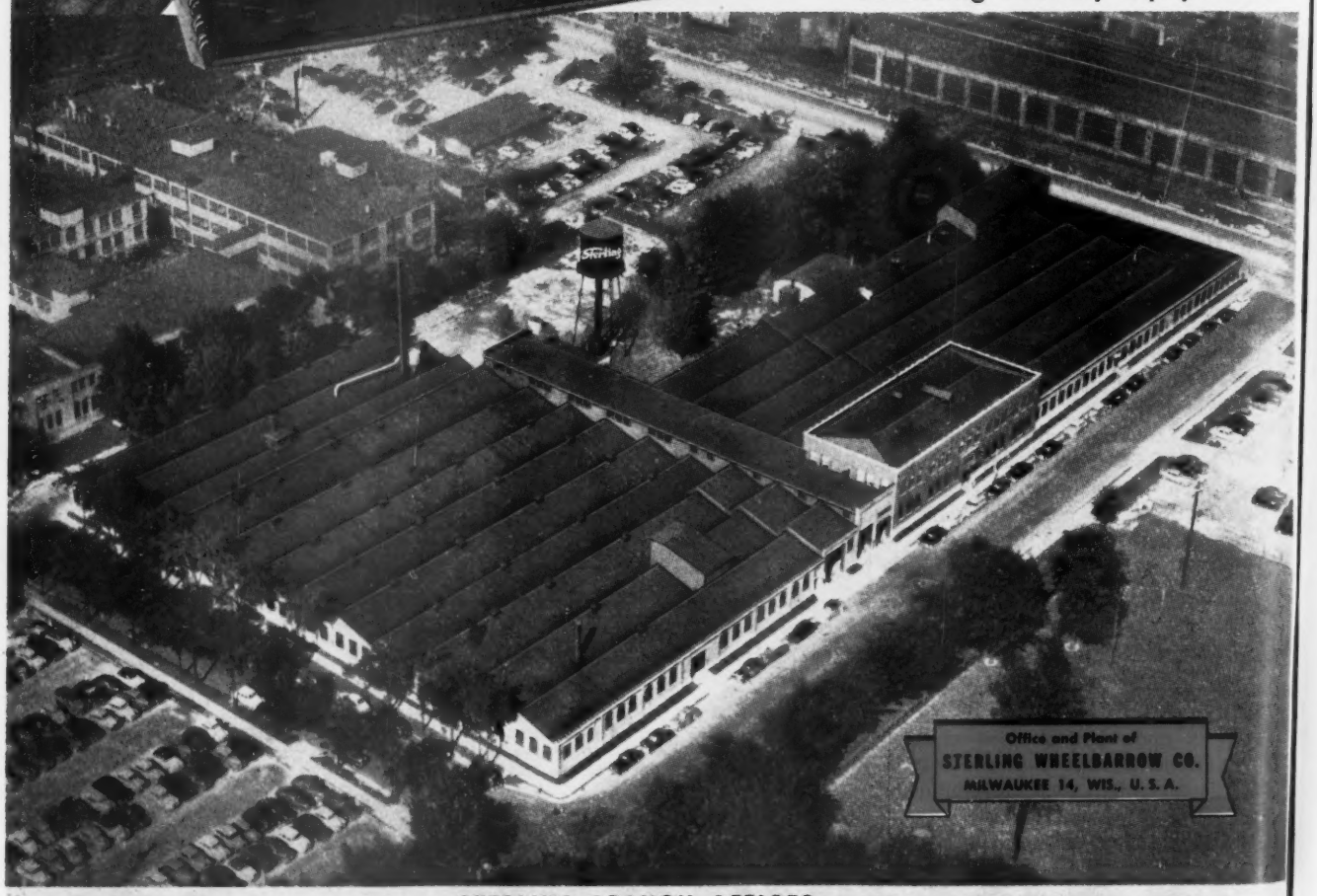

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Gag Rules Delay Production

FOLLOWING President Truman's gag rule, thinly disguised as an executive order relating to the classification and handling of security information, Manly Fleischmann, administrator of the Defense Production Administration and the National Production Authority, has issued "procedures" for those agencies to follow in "carrying out" the order.

In issuing the procedures, the administrator maintained that they are consistent with both the president's order and the information policy followed since the establishment of NPA and DPA. He further stated: "Proper safeguards have been and will be followed with respect to information concerning national security, and all other information has and will be considered public information. I have explained to all concerned with administration of security regulations that security information must be carefully guarded but that we must never forget that the American people have a fundamental right to non-security information regarding the activities of government agencies." Why are such high-sounding phrases and an elaborate committee setup necessary if "proper safeguards have been followed" in handling security information?

Experience has shown that the backwash of these so-called security orders extends far beyond the protection of military secrets. For example, the long-standing practice of defense agency men being permitted to accept invitations to attend industry meetings and discuss mutual problems developing from government actions and controls changed considerably immediately after the gag order was announced. Several instances of this tightening have developed in the foundry industry. Three OPS representatives made last-minute cancellations of previous commitments to talk before an eastern AFS chapter without giving very good reasons. Numerous requests and a strongly worded telegram from the board of directors of the Gray Iron Founders' Society failed to pry loose an OPS representative to discuss amendments to the pricing order for castings at the annual meeting, much to the concern of the gray iron industry. The Foundry Equipment Manufacturers' Association asked that the chief of the Equipment and Supplies Section of NPA appear on the annual meeting program, but he was not permitted to attend.

Emphasis on security can be the excuse to cover up mistakes within government agencies, and prevent criticism of operations from reaching top brass. Recently, in preparing for a high-echelon meeting to discuss the problems of several closely related industries, government representatives in the sections handling those industries were required to clear their talks with branch heads. Inclusion of material critical of defense agency activity was not permitted.

If the lag in defense production is to be overcome, government and industry must work closer together.

So let's stop this cover up with gag rules promulgated under the guise of security.

Frank G. Steinbach
Editor

THE BASIC-LINE

ALTHOUGH basic-lined cupolas have been operating successfully in Europe for some years, it has been only within the last two years that real interest in the process developed in this country. Perhaps 40 basic-lined cupolas now are operating in the United States under nearly every foundry condition to produce a wide variety of special products as well as ordinary gray iron. At the same time, much of the discussion concerned with the why's and wherefore's of basic cupolas are fraught with unproved but interesting theories. But as Mark Twain said, "A theory without proof is like a man without bones. He looks all right but has a hard time standing up." This article will refrain from theory as much as possible and report primarily what has been seen, or what trustworthy people have disclosed.

Aside from a desire to keep up with the Joneses, there are a number of good reasons, for converting a smoothly operating acid cupola to basic with its attendant and often heart-breaking difficulties. These are:

1. It is no trick to cut sulphur in half; with some additional care it may be lowered much further.
2. The fact that basic cupolas are operating with only steel scrap and a little remelt is a strong inducement to convert in these days when pig iron is expensive and not plentiful.
3. Carbon content of the metal may be raised well beyond the original carbon content of the charge and controlled with a fair degree of certainty.
4. Clean drops may be had and the process of cleaning out the cupola and patching it is a relatively simple one.
5. With reasonable care, the brick lining will last indefinitely.
6. With all these advantages, one operator reports that savings in labor and quantity of material used have more than counterbalanced the higher cost of the basic refractories.

The purpose of this article is to provide a guide that may help avoid or overcome some of the difficulties in converting from acid to basic operations.

Fig. 2—Pneumatic refractory gun used to apply a monolithic lining to the inner wall of the cupola

Fig. 3—Tarpaulin and wheelbarrow under cupola catch refractory which drops during application

CUPOLA

Recommendations for installation of the lining and operation of the basic-lined cupola are offered by the author in this paper presented before the second annual Texas Regional Foundry Conference

By J. P. HOLT
Basic Refractories Inc.
Cleveland

The early periods of this conversion were difficult for some foundries, but by now a fairly sizable store of information has been gathered. This education has been costly and the pioneers deserve a great deal of credit for their perseverance.

Depending upon the type of product to be produced the cupola's tuyeres may have to be raised so that a thick slag blanket will be provided. Specifically, the sulphur content of the tapped metal is the governing factor. If sulphur must be under .03 per cent, it is advisable to have an average of 11 in. of slag on the molten iron. If the sulphur specification will allow as high as .07 per cent, about 6 in. will do. The amount to raise the tuyeres will depend upon the present geometry of the cupola. Suffice to say that sufficient height in the holding zone must be obtained to permit maintenance of a slag blanket of adequate average depth.

Slag holes of rear slagging cupolas are subjected to severe erosion in basic operations. Consequently, it is dangerous to have them too close to the tuyeres, and the top of the finished slag hole should be at least 4 in. below the bottom of the tuyeres. Basic slags have quite different temperature-viscosity characteristics than acid slags, but in general the size of slag hole openings and slag troughs that were successful in acid practice will be satisfactory. Currently experiments are being conducted with bronze and cast iron water-cooled slag holes. I hesitate to recommend these types because, to my knowledge, they are still in the experimental stage and there are obvious dangers of steam explosion in such a setup.

With minor changes to the cupola's ironwork made (if they are required), we can proceed to the refractories.

The basic brick lining is made of magnesite brick. These brick are heavy, dense, have relatively high thermal conductivity and are apt to spall and crack

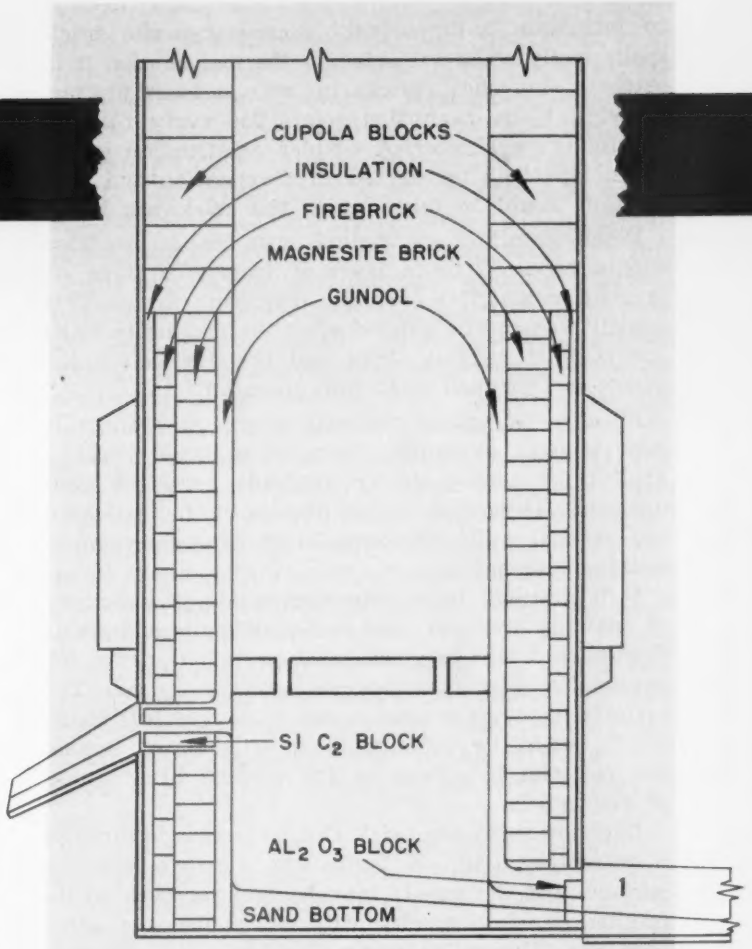


Fig. 1—Cross-sectional view of typical lining in the hot zone of a basic-lined cupola

badly when heated or cooled rapidly. They should not be used as an inner working surface, but they will resist the chemical attack of basic slag should the monolitic inner lining fail.

The basic lining of a cupola is expensive. The materials cost several times as much as comparable acid (or fireclay) substances, so it is advantageous to use them only in the melting zones and wells. In the upper portions of the cupola the lining need not be changed to convert to basic operations. Re-brick sufficiently far above the tuyeres to include all of the area that is regularly burned out severely. Lay a course or two of magnesite brick on the inner face over a firebrick backing, with an insulating material between the latter and the steel shell. The magnesite brick should be at least 4½ in. thick for smaller cupolas and for the bigger ones (more than 54 in. ID) 9 in. should be used. Nine in. magnesite wedge brick make an excellent lining, but two courses of standard arch brick and straights are satisfactory.

If the cupola is so small that there is no room for a course of regular fireclay brick behind the magnesite brick, the clay brick may be omitted, but it is advisable to put on at least an inch of good insulating material next to the shell. Magnesite con-

ducts heat two or three times faster than fireclay, so insulation is important. Since magnesite brick spalls badly when subjected to thermal shocks, it is better to lay these bricks up with a basic mortar, allowing ¼-in. expansion joints for every foot on the lining's perimeter. A simpler construction would be to lay them up dry so that expansion and contraction would be taken up in the brickwork itself.

When installing an original basic lining, provision should be made for a layer of from 2 to 4 in. of monolithic material over the magnesite brick. This monolith should be applied after the magnesite brick has been thoroughly dried and the day before the cupola is scheduled to go into operation.

Since a refractory material known as Gundol is suitable as a monolithic lining of a basic cupola, I shall refer here to it by its trade name for convenience. It was originally developed for patching the vertical walls of steelmaking furnaces where it still finds its major use.

It is granular basic refractory made of a mixture of specially prepared dead-burned dolomite and stable dead-burned high-magnesia clinker. It is designed for application through a pneumatic refractory gun. The material contains a small quantity of chemical bonds which, with the addition of a little water, enable the material to adhere to the vertical brick lining of the cupola.

Over the magnesite brick, Gundol is applied through a refractory gun. It forms the cupola's working surface, and the cupola may be brought back to its original inside diameter with an application after each run. Generally during the cupola run, the well is affected very little, but the melting zone just above the tuyeres is washed away at the rate of about ½ in. per hour. Actually the erosion during the first two hours is a little faster than this; after 10 or 12 hours it is somewhat slower.

Currently, successful patches up to 8 in. thick are being applied on the linings of cupolas which are running as long as 17 hours. When a heavy (4 in. or more) patch is to be applied, it is better to have the cupola walls hot enough to dry out this material during the application.

The application of a Gundol lining through a pneumatic refractory gun is relatively easy. To conserve the refractory, it is advisable to place a tarpaulin and a wheelbarrow under the cupola to catch the material that drops (Fig. 3), so that it may be used again after drying overnight. Since the drop contains a high percentage of larger particles, this drop should be mixed with about 30 per cent of a refractory whose top grain size is smaller than the original composition. This smaller grained refractory, chemically identical with Gundol, is known as Gunmix.

For continuous-tapping cupolas, Gundol may be used successfully for the tap holes, and it is used to some extent to line spouts and forehearths. However, though it is employed at several foundries where intermittent tapping is used, most places find that a solid brick better withstands the constant jarring of plugging and opening the tap hole. One operator uses a drilled 99 per cent alumina brick to face off the outside of the taphole and gets excellent service from it.

If the cupolas are front slaggers, the slag hole problem is not too difficult to solve and a Gundol taphole and a firebrick spout and dam covered with

Fig. 4—View from bottom of cupola showing inside cleaned out prior to installing monolithic lining.

Slag hole block and tuyeres visible. Fig. 5—installing the monolithic lining inside the cupola

an inch or two of that material will work very well. Although one cupola is tapping 180 tons of gray iron a day in a 17-hour run through such a taphole, some front slaggers have had trouble. One operator uses a carbon-lined taphole and another is experimenting with one made of electrically fused magnesia.

However, if the slag must run out the back of the cupola, there will be chronic difficulties with the slag hole's enlarging. One operator uses nothing but Gundol, and under his particular conditions (producing Meehanite) results are highly satisfactory. Another foundry, producing nodular iron, uses two slag holes of this refractory. It runs on one hole until it gets too big, then closes it and opens the other. The best slag hole the author has seen is made of a carbon-bonded silicon-carbide block with a 1-in. hole. This block is set in place with Gundol.

The following slag hole materials have been tried a number of times without success:

1. Fireclay brick, ganister or fireclay. These slag holes are washed out as soon as the hot basic slag hits them.

2. Magnesite brick. These brick crack and disintegrate as soon as the heat hits them.

3. High-alumina brick. These brick, mentioned previously as a facing for the tap hole on an intermittent tapping cupola, are destroyed when in contact with basic slag.

Probably the most important factor contributing to the erosion of basic refractories in a cupola is the amount of silica (Si_2O) entering the cupola with the charge. Although some silica is derived from the silicon content of the metallic charge, most of the silica comes from molding sand which adheres to the gates, risers and scrap castings making up the remelt scrap. It is well to bear in mind that silica is an acid oxide, and although it is impossible to exclude it entirely from the slag, reasonable precautions should be taken to remove most of it.

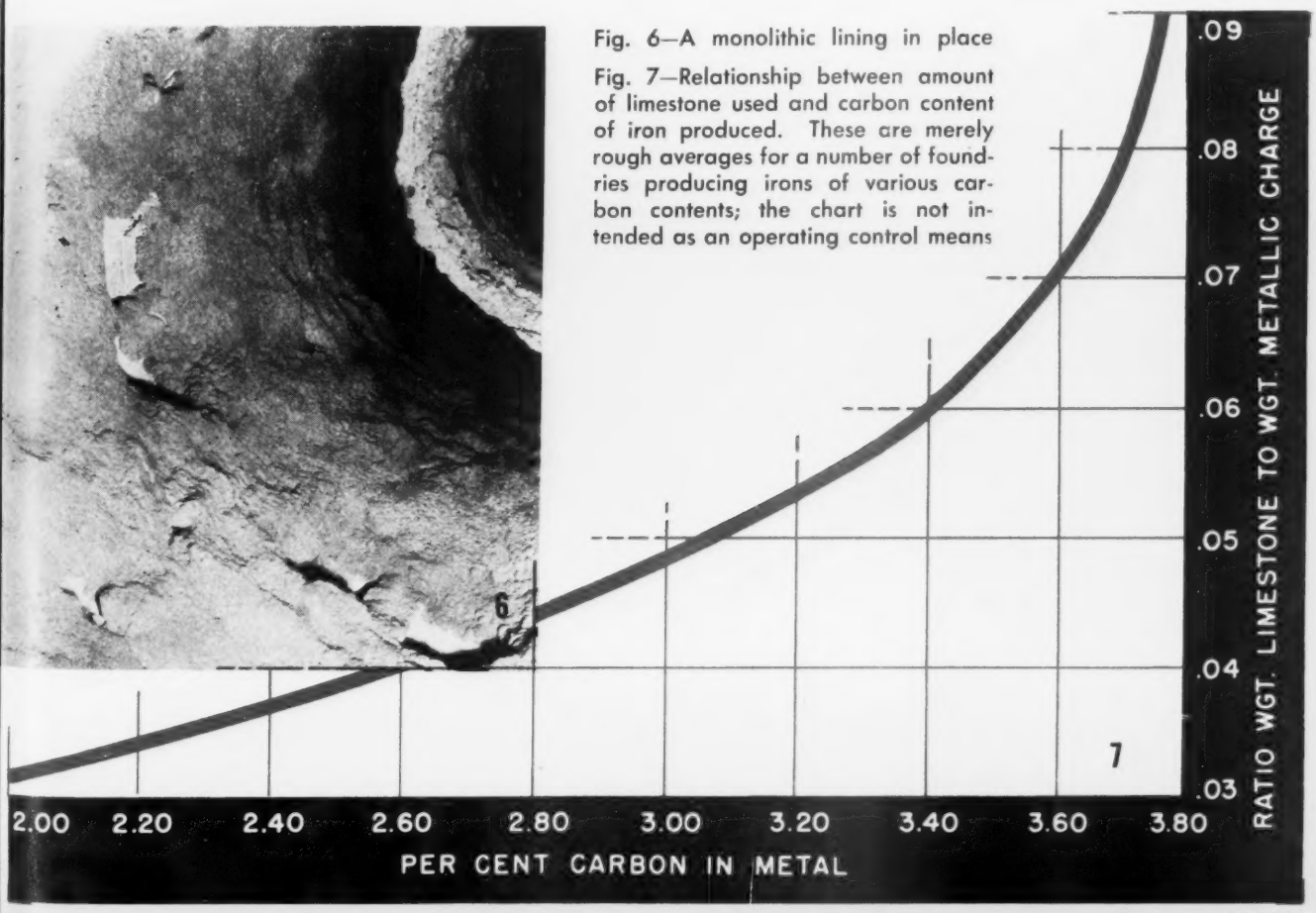
Chemical analyses of slags procured from a large number of cupola runs whose charges had widely different silica content do not show any significant change in their basicity ratio. This ratio, the sum of the percentages of definitely basic oxides divided by the total percentages of definitely acid ones, generally stays around 2.5. All of these slags removed sulphur and the amount removed seemed more dependent upon the average slag thickness than the variations in its chemical composition. These cupolas were lined with Gundol which contains free lime. Thus it is important to remember that an excess of silica in the slag will cause a rapid attack on such a lining until the slag's composition returns to normal. In other words, this lining acts somewhat like a chemical buffer, neutralizing excess acid oxides until it is completely dissolved.

The magnesite brick then takes the attack and, despite large and continuous silica additions, the slag will not become permanently acid until it gets through to the fireclay back-up brick. In this event, the only recourse is to stop the cupola and drop bottom to prevent a run-out.

Excess silica in slags promotes rapid attack of the slag hole as well, and in general contributes nothing to the operation except to promote slag fluidity. It may be well to point out here that highly basic slags of over 3.0 basicity ratio are obtainable under certain conditions, but their (*Please turn to page* 264)

Fig. 6—A monolithic lining in place

Fig. 7—Relationship between amount of limestone used and carbon content of iron produced. These are merely rough averages for a number of foundries producing irons of various carbon contents; the chart is not intended as an operating control means



By PAT DWYER and ROBERT H. HERRMANN
Engineering Editor and Associate Editor
FOUNDRY

TINY ENGINES Are BIG Business

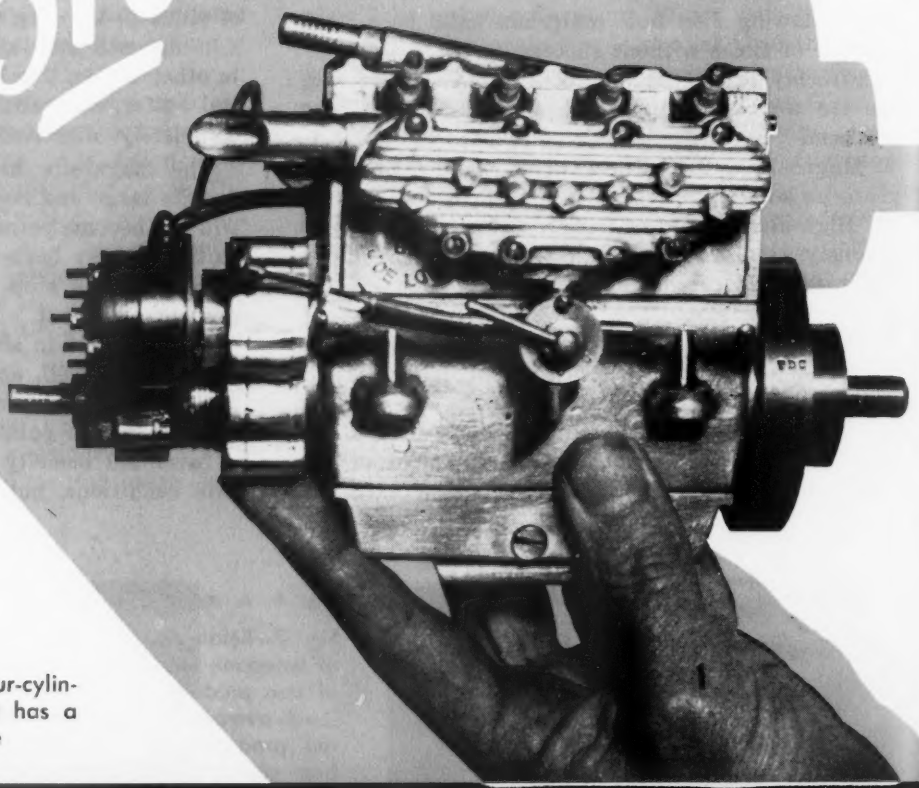
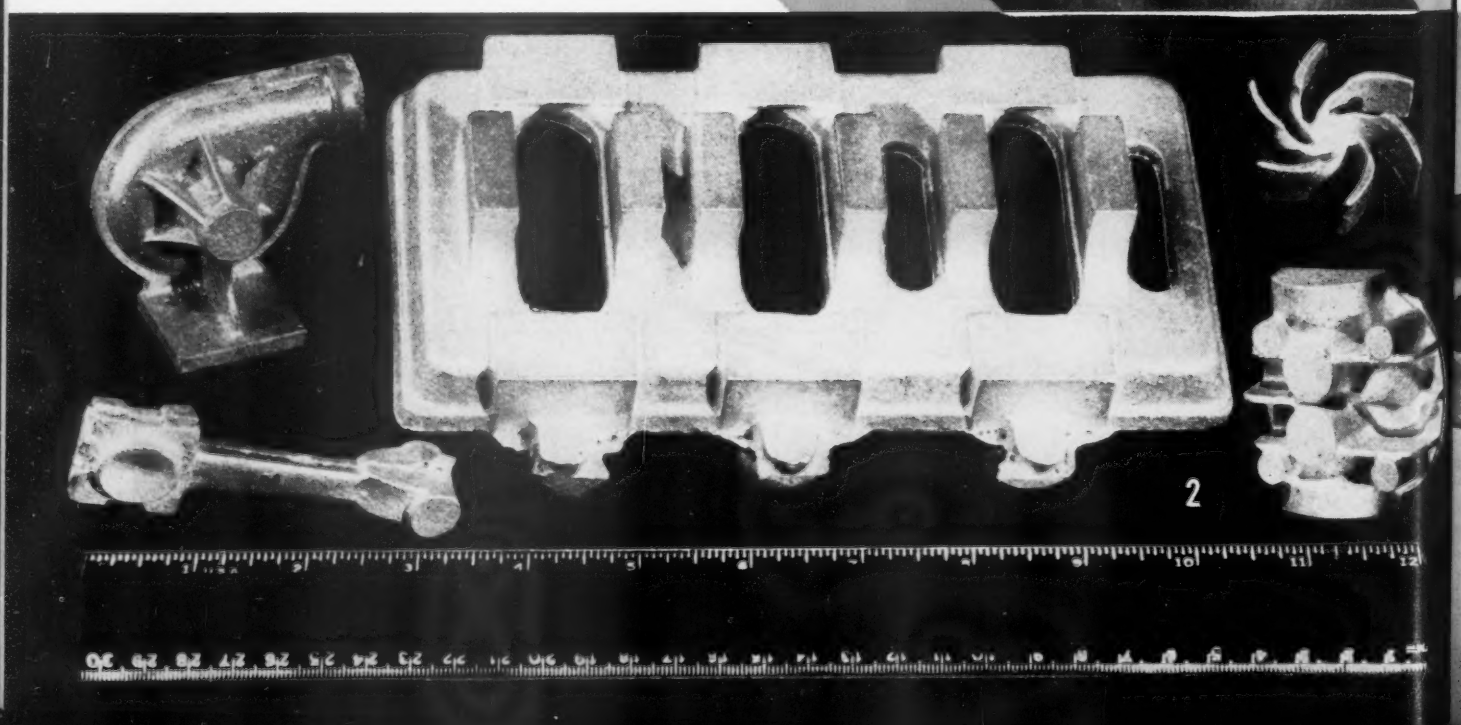


Fig. 1—Miniature water-cooled, four-cylinder, four-cycle gasoline engine. It has a ⅝-in. bore and ¾-in. stroke



TO THE mechanically minded person with an eye for precision and beauty, no other creation is as fascinating as a perfect miniature and sweetly running engine. Desire to own one grips him like a vise from which there is no release until after months of enthralling effort he opens the throttle and the little beauty comes to life.

Many men with this desire, the opportunity, the mechanical equipment and the manual dexterity have been frustrated through lack of patternmaking and foundry knowledge and facilities. With a supply of castings they could tackle the job with enthusiasm. Without castings they are stymied.

When the miniature engine business slowed down almost to a stop for want of hobbyists with a combination pattern shop, foundry and machine shop training, a foundryman gallantly leaped into the breach with the necessary facilities to supply all the castings required.

In a foundry almost as small as the model engine castings it produces, Wayne Miller, foundryman, and Alfred T. Vannerson, draftsman, partners in the Miniature Engine Laboratories, Sandusky, O., supply the needs of model engine hobbyists throughout the world. During 1950 the company either directly or through its distributing centers in North and South America, Europe, Philippine Islands, China, South Africa, and Australia, sold approximately 6000 kits containing working drawings and essential castings for various model engines. Almost every type of miniature engine is made, (*Please turn to page* 269)

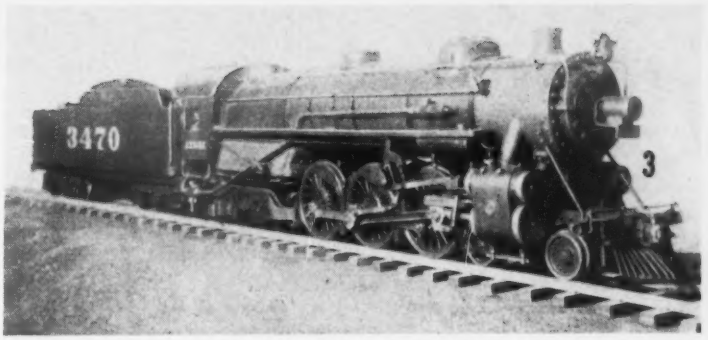


Fig. 3—Hudson live-steam locomotive. It is about 40 in. long, weighs 200 lb, has a bore of ⅞-in., stroke of 1⅛-in., and will haul two men. The kit for this model contains 128 castings

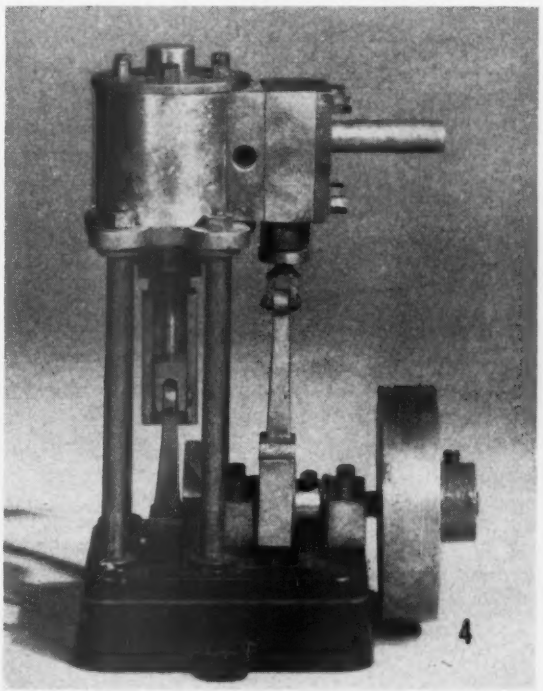
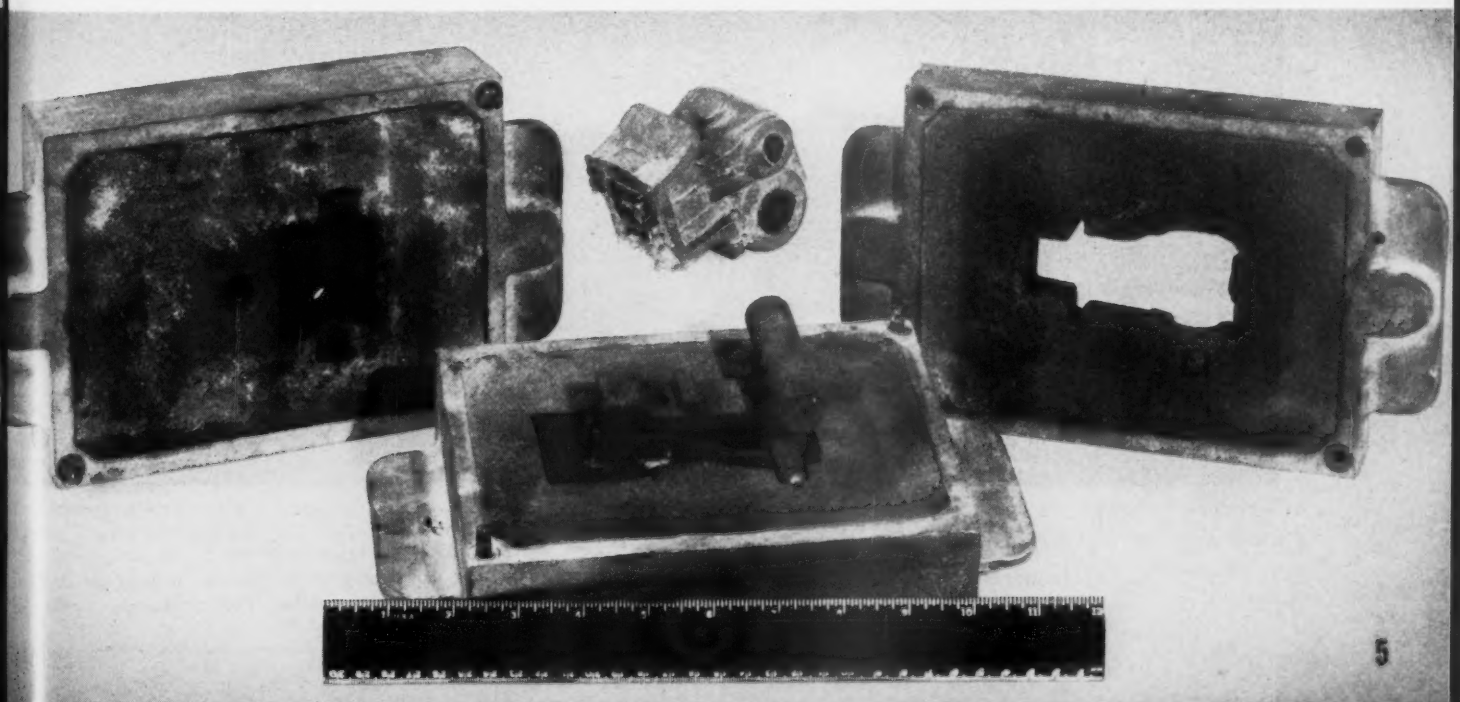


Fig. 4—One-cylinder steam engine with ⅝-in. bore and stroke. Overall height is 1¾-in.

Fig. 2—Typical miniature castings produced at Pirates Cove. Large piece is a bed for the Hudson steam locomotive shown in Fig. 3. The other pieces, left to right, are: Centrifugal water pump casing, connecting rod, impeller for the centrifugal water pump, and a gasoline engine cylinder head

Fig. 5—Cope, cheek, and drag with core assembly for making the cylinder at top center used in the Hudson steam locomotive shown in Fig. 3. This is a dry sand mold in an 6 x 8-in. aluminum flask



Eye

By BENJAMIN MELNITSKY

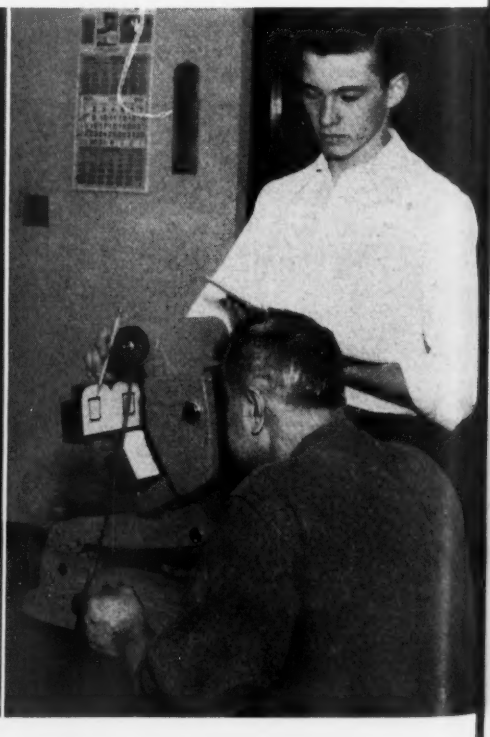


Fig. 1 (left)—Worker's vision being checked with American Optical Co.'s Sight-Screener. Fig. 2 (right)—Testing foundry worker's vision with Keystone View Co.'s occupational vision service Telebinocular at Meadville Iron Co., Meadville, Pa.

Conservation

IN THE FOUNDRY

THE EYE injury frequency rate for foundries is six times as great as that for industry as a whole. Yet George L. Mitsch, plant manager, American Car & Foundry Co., St. Louis, is able to state with justifiable pride that "as far back as our records go, to 1923, there has never been an eye lost or partially disabled in our plant." Dr. Herman Sager, optometrist and supervisor of the eye service department, Sperry Gyroscope Co., is in an equally enviable position. He states: "Since 1944 there has not been a single accidental loss of vision among our 12,000 machine shop and foundry employees. Nor has there been even one serious eye accident resulting in partial loss of sight during this seven-year period."

These and a few other bright spots in the picture of vision-conservation in foundries offer an important object lesson. The tremendous toll of serious eye mishaps can be reduced; with a little luck it can be eliminated almost completely.

The cost of a single lost eye in terms of compensation payments, lost work time, disrupted production and other expenses is easily $25,000. This is on the authority of Dr. Franklin M. Foote, executive director of the National Society for the Prevention of Blindness, a nonprofit organization which has pioneered in the field of eye conservation on the job and in the home. The cost to the unfortunate worker is much greater—the National Safety Council estimates it as a one-third cut in his earning power.

The answer to this vital problem is not the one-dimensional approach typified by the edict posted on the shop bulletin board: "Everybody must wear safety goggles, shields, masks or some other type of eye protector *or else.*" The *or else* is instant dismissal. Of course, compulsory wearing of these devices is definitely part of the answer. American Car & Foundry has had such a rule in effect for many years. But compulsion alone is not enough.

Primarily, there's no guarantee that employees will wear the goggles given them. There's even less certainty that supervisors will report infractions of rules. An individual who has never worn ordinary spectacles often finds the safety variety uncomfortable. They steam up, have to be cleaned every so often, they may not fit properly and, far too often, are not the right type for the job. Forgetfulness, indifference, carelessness and infantile infractions of safety rules for any one of a hundred reasons sentence thousands of workers to life-long blindness. Close to 80 per cent of all plants checked by the Society for the Prevention of Blindness supply personal eye protective equipment to every exposed worker. Yet each year eye mishaps cost employers and workers more than $200,000,000.

The approach followed at American Car & Foundry is: Enforcement of rules regarding compulsory wearing of eye protectors, *plus* education of foremen in policing these regulations, *plus* education of the average workers who, according to the company, "are responsible for their own injuries."

Departmental safety meetings, posters, articles in the plant newspaper, and other means for taking safety to the employee on a strictly personal basis have been employed at American Car & Foundry.

HOW VISION TESTING HELPS TO CUT ACCIDENTS

In 1944 a minimum visual safety standard was developed in a large industrial plant after extensive study of visual characteristics of injury-free and injury-susceptible employees in the glass, lens and machine tool divisions.

In 1948, testing of foundry employees in the same plant again proved that accident reduction can be accomplished by the use of this same standard as a minimum safety requirement for all employees and applicants.

INJURY RECORD OVER A 2-YEAR PERIOD BURNS, CUTS, BRUISES, FRACTURES, SPRAINS, AND LACERATIONS

	Foundry Employees Who Met Vision Safety Standard	Foundry Employees Who Did NOT Meet Vision Safety Standard
% having injuries	23	52
% having two or more injuries	0	33
Average No. of minor injuries per person	.24	.84
Average No. of reportable injuries per person	.08	.64

The excellent safety record of the foundry can still be improved by eye care for those employees who would benefit most. Eye care means the referral of employees who do not meet the vision safety standard to optometrists or ophthalmologists for visual examination. Many of the employees are given corrective lenses to enable them to meet the vision safety standard. The safety record can also be maintained by selecting new employees from applicants who meet the minimum safety standard.

Nor has this firm being sparing of ingenuity in furthering the desirable ends of this vital program. On the basis of a letter from an employee in the grinding room, the first Wise Owl Club was formed in 1947 in the St. Louis foundry. The idea behind this organization is both simple and brilliant. All ACF men who had saved the sight of one or both eyes during an industrial accident as a result of wearing safety goggles or other eye protectors could become members. A survey of the firm's ten plants located 76 eligibles. Each was given a diploma and a gold pin of the bespectacled wise owl to wear on his work clothes. In four years, membership has increased to 232 ACF employees. They represent a direct saving to the company, in compensation payments alone, of $696,000.

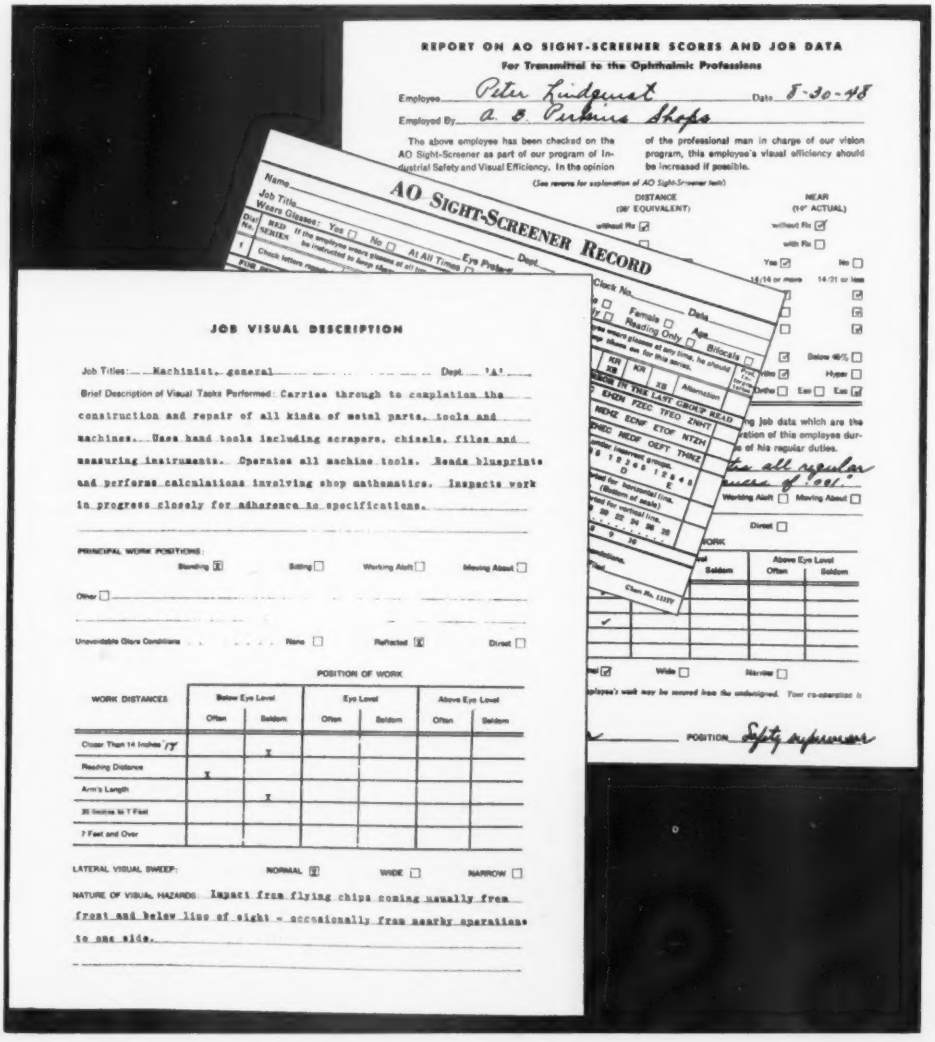
Since 1949, sponsorship of the Wise Owl Club has been assumed by the National Society for the Prevention of Blindness, which proudly boasts of over 2000 members in nearly 400 industrial plants throughout the United States and Canada. As a society spokesman explains, "Each Wise Owl member has had the dread experience of almost losing an eye. He's a missionary of eye conservation, reminding others of the need for unending vigilance."

At the Sperry Gyroscope Corp. roster of Wise Owl Club members is posted conspicuously in the plant cafeteria (Fig. 4). Each member is represented by a pair of damaged safety glasses and a white card which describes the accident in which the goggles played the eye-saver role. Scattered throughout the plant are posters designed by Sperry artists. One of them shows nothing more than a huge black square and reads: "What a blind man sees." The plant newspaper frequently carries articles on eye conservation by Dr. Sager; other available media are employed effectively in spreading the good word that vision need not be lost on the job. This program has been so successful that workers now refuse to start the day's work unless their eyes are protected.

Protection against accident is but one part of the Sperry eye safety program. Sharing equal attention are pre-placement examinations of new employees and the correction of visual difficulties among present workers.

This interest in employees' vision has nothing to do with social consciousness on the managerial level. There's a truly practical reason. The Occupational Research Center at Purdue University checked employees at a U. S. Ordnance plant and found that 65 per cent whose vision was rated as adequate were accident free, while only 45 per cent of those whose seeing power was not up to snuff were similarly free of involvement in accidents. Other researchers have found significant correlations between vision and productivity. A group of machine operators was checked with modern optical instruments. Close to 90 per cent of those with a high work rating qualified visually; only 32 per cent of those with a low rating qualified visually. Since over 80 per cent of the average employee's daily activities are controlled by vision, it is not to be wondered that seeing ability bears a close relationship to efficient plant operations. Yet the record is anything but good. The average worker does not see as well as he should; many see so poorly that their work is seriously impaired.

In December, 1943 screening tests were given to 300 employees, aged 40 and over, at Sperry Gyroscope. The astonishing results were: 75 per cent required prescription glasses or changes in the glasses they were then wearing. At the Shell Pipe Line


REPORT ON AO SIGHT-SCREENER SCORES AND JOB DATA
For Transmittal to the Ophthalmic Professions

Employee Peter Lindquist Date 5-30-48

Employed By A. B. Perkins Shops

The above employee has been checked on the AO Sight-Screener as part of our program of Industrial Safety and Visual Efficiency. In the opinion of the professional man in charge of our vision program, this employee's visual efficiency should be increased if possible.

AO SIGHT-SCREENER RECORD

JOB VISUAL DESCRIPTION

Job Titles: Machinist, general Dept. 'A'

Brief Description of Visual Tasks Performed: Carries through to completion the construction and repair of all kinds of metal parts, tools and machines. Uses hand tools including scrapers, chisels, files and measuring instruments. Operates all machine tools. Reads blueprints and performs calculations involving shop mathematics. Inspects work in progress closely for adherence to specifications.

PRINCIPAL WORK POSITIONS: Standing ☒ Sitting ☐ Working Aloft ☐ Moving About ☐

Other ☐

Unavoidable Glare Conditions: None ☐ Reflected ☒ Direct ☐

POSITION OF WORK

WORK DISTANCES	Below Eye Level		Eye Level		Above Eye Level	
	Often	Seldom	Often	Seldom	Often	Seldom
Closer Than 14 Inches						
Reading Distance	X	X				
Arm's Length		X				
20 Inches to 7 Feet						
7 Feet and Over						

LATERAL VISUAL SWEEP: NORMAL ☒ WIDE ☐ NARROW ☐

NATURE OF VISUAL HAZARDS: Impact from flying chips coming usually from front and below line of sight - occasionally from nearby operations to one side.

POSITION Safety Supervisor

Fig. 3—These typical job analyses forms are based on vision examination by the Sight-Screener

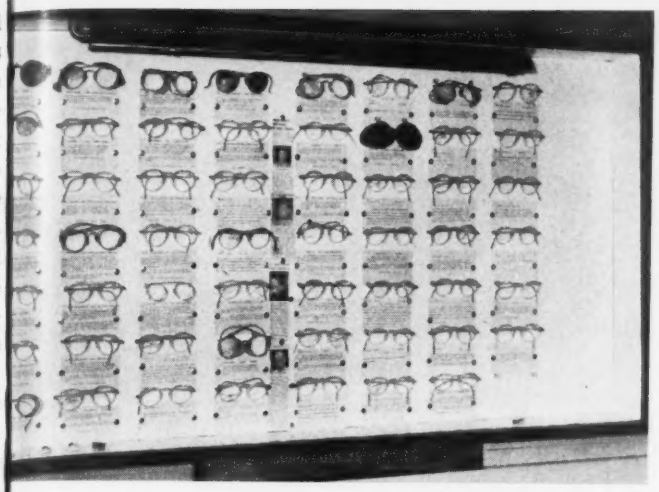


Fig. 4—Display of broken goggles attests to eye accidents prevented at Sperry Gyroscope Corp.

Co. 1200 employees, young and old, were given eye checks. "Twenty-eight per cent had some type of significant visual difficulty," a company spokesman notes. At the Caterpillar Tractor Co. Peoria, Ill., screening of 5688 employees found 1265 had unsatisfactory vision.

A recent survey shows that, among companies with 100 employees or less, only 20 per cent made pre-employment vision tests. Only 42 per cent of those with 100-250 workers did so. The figure for plants with 251-1000 is 54 per cent. Those with 1001-2000 rate a better 63 per cent. For still larger firms the figure is 71 per cent. If this quantitative picture is bad, the qualitative one is even worse. Half of the firms which checked employee vision used only the familiar Snellen Chart, which is considered inadequate for most industrial needs. Field of vision, muscle balance, depth perception, color discrimination and other factors which play a tremendous role in a worker's seeing powers cannot be rated with this type of equipment.

The alternative is not necessarily the costly one of sending the entire plant to optometrists or ophthalmologists. Instead, portable instruments have been developed by Baush & Lomb Optical Co., American Optical Co. and the Keystone View Co. which permit nonprofessionals to check the seeing powers of company employees anywhere in the plant (Figs. 1, 2). These instruments—called Ortho-Rater, Sight-Screener, and Telebinocular, respectively— do not diagnose; instead, they merely produce a record of the subject's visual abilities which is then analyzed by a professional eye specialist.

Using an Ortho-Rater, Sperry Gyroscope recently checked the vision of 130 job applicants. It was found that 15 failed to meet minimum visual standards for the job. Significantly, these 15 would have been hired without discovery of their visual incapabilities were ordinary Snellen Chart testing methods used exclusively. As it was, 11 of the 15 had their eyes corrected by their own doctors and were hired.

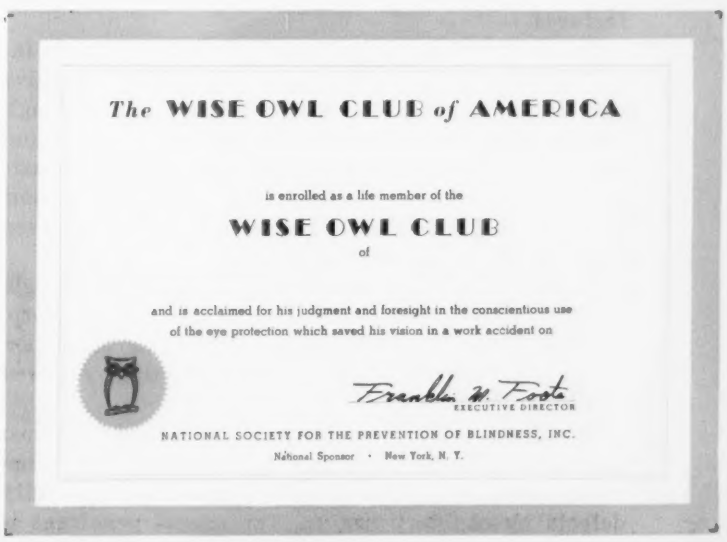
Since the eye safety program was instituted in 1944 at Sperry Gyroscope over 25,000 vision screening tests have been performed by the technician who operates the Otho-Rater, and results of each have been analyzed by the optometrist. Approximately 40 per cent of those tested were found to require new prescriptions or correction glasses for the first time. Foundry and machine shop workers are provided with free safety goggles, either plano or prescription. Since the program was initiated all Sperry employees have had their eyes checked at least once; periodically, free examinations are given to old workers.

The third phase of the Sperry program—pre-placement examinations—is based on the sound assumption that vision is a variable thing. Eyesight that is adequate for inspection work may be just the opposite for crane operation. For example, lack of depth perception and the inability to judge distances accurately would bar an individual from handling mobile equipment. A worker with a high degree of near or far sightedness may experience discomfort and eye fatigue if placed on a job demanding prolonged attention at near distance. This holds true even if he's wearing corrective glasses.

At Sperry, as in numerous other alert plants, each job is analyzed from the vision standpoint. (A typical job analysis form prepared by the American Optical Co. is shown in Fig. 3.) On the basis of such an analysis a vision standard for each work classification is prepared. An applicant for the job has his vision checked on the Ortho-Rater and compared to that specified in the standard. If he fails to meet the standard, he is asked to have his eyes checked and corrective glasses procured.

Safety goggles, eye testing devices, even the services of a qualified eye specialist are not enough. Before a foundry can reap the manifest benefits of vision conservation, it must view the problem in all its aspects. Having done so, the next logical step is to institute a program which attacks the problem of employee vision from all angles. Elements in such a program might be summarized briefly as follows:

1. Full or part-time (*Please turn to page* 268)



The **WISE OWL CLUB** *of* **AMERICA**

is enrolled as a life member of the

WISE OWL CLUB

of

and is acclaimed for his judgment and foresight in the conscientious use of the eye protection which saved his vision in a work accident on

Franklin M. Foote
EXECUTIVE DIRECTOR

NATIONAL SOCIETY FOR THE PREVENTION OF BLINDNESS, INC.
National Sponsor · New York, N. Y.

Fig. 5—Diploma given to members of the Wise Owl Club of America. Club membership exceeds 2000

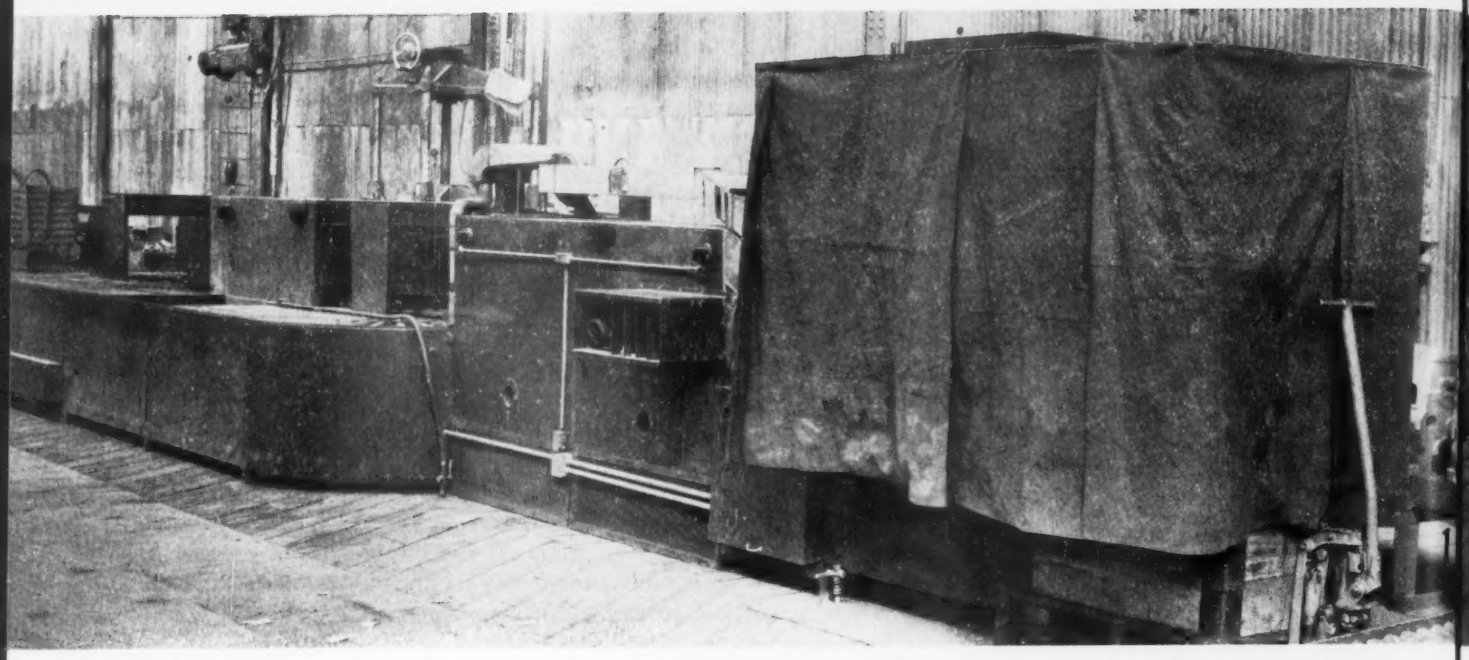


Fig. 1—Automatic inspection unit installed at plant of Caterpillar Tractor Co., Peoria, Ill.

Automatic Conveyorized Unit

Used in Black-Light

IN BUILDING heavy units for industrial and construction use, such as the diesel engines, tractors, motor graders and earthmoving equipment produced by Caterpillar Tractor Co., Peoria, Ill., it is important to the manufacturer that its units are reliable in service. Since Caterpillar units are often used in dangerous operations, such as mountain highway grading or in tearing down buildings from the top down, the company has taken steps to control the quality of critical castings as received and as manufactured.

Nondestructive test inspection with Zyglo was instituted with hand-operated equipment, and effective control was achieved on the critical castings. Through the years, increased need and application were found for Zyglo as a receiving inspection of malleable castings, until the tonnage of parts going through the unit was very high and hand-operation greatly increased the man-hours expended.

A specially designed automatic conveyorized Zyglo unit was developed and furnished by Magnaflux Corp. It was installed early in 1950 for receiving inspection of assorted malleable and gray iron castings received at Caterpillar.

When inspecting with Zyglo, the as-cast cleaned castings are dipped into a fluorescent oil base penetrant which is drawn into all crack and porosity defects by capillary action. The excess penetrant is washed from the surface with water, being water emulsifiable. A developer suspension of powder is then applied and the parts are dried in a recirculating hot air drier.

The developer dries to a thin film of powder on the surface of the part which draws the fluorescent penetrant back out of the defect. The parts are inspected by viewing them under black light in a darkened booth. Any defect is marked by a glowing fluorescent light; a glowing line marks a crack and glowing spots mark individual pores. This indication is quickly seen and interpreted by the inspector, as it appears on the part directly at the defect.

The automatic conveyorized type ZA-19 Zyglo unit, built for and installed at Caterpillar, accomplishes the above processing steps automatically when parts of various sizes and shapes are placed on the moving stainless mesh conveyor belt (Fig. 1). After full processing and development of fluorescent Zyglo indications of defects, the conveyor deposits the parts in the inspection booth before the inspector under a bank of high intensity black lights. The inspector need only look at the surface of the part to see indications of all pore and crack defects present.

Of specific interest is the way in which the penetrant, drain, wash and drier operations are accomplished on some of the very complicated almost-closed-section castings, that are used in Caterpillar

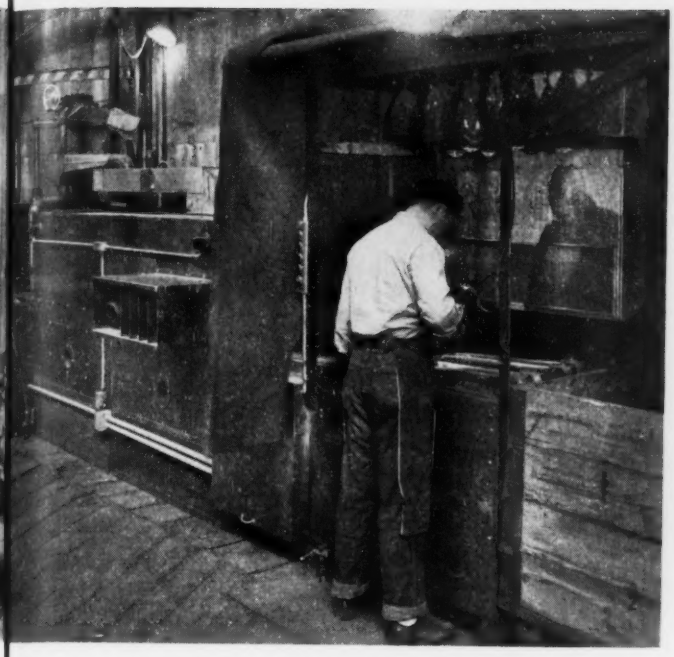


Fig. 2—Inspector viewing castings treated with penetrant under bank of high-intensity black lights

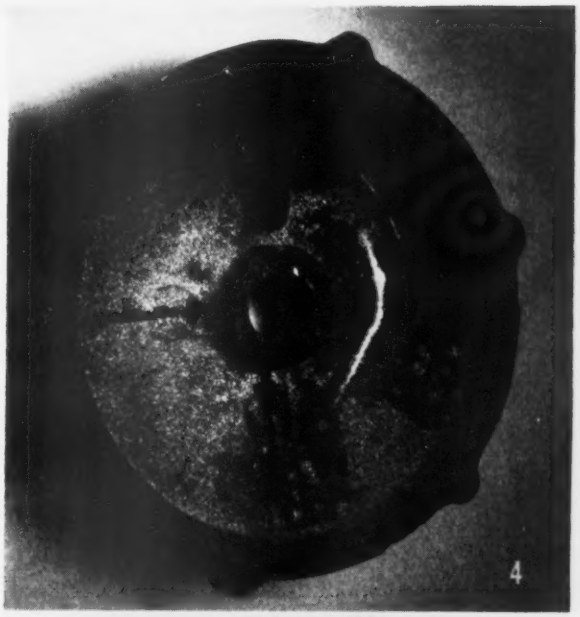
Fig. 3—Typical fluorescent indication of crack in a casting shown in natural light in Fig. 3A

Inspection

units. The endless moving conveyor is adjustable in speed from 6 to 24 feet per minute, and parts are placed on it at the loading station, in such a position that the surface will drain liquids.

Parts are first carried through a penetrant station where the oil-base penetrant is spray-applied with a complete ring of nozzles around the part, hitting it from all directions. The penetration time is accomplished by a space in the unit through which the conveyor moves to the wash station.

Of special note in the operation of the unit are the details of the wash station where water removes the emulsifiable penetrant from all surfaces of the parts as they pass through on the conveyor. Some features in this washing unit are believed unique. A ring of high-velocity spray nozzles is located entirely around the part as it passes through, and these nozzles are oscillated mechanically, forward and backward, over the part to strike it with high-velocity water droplets from all possible angles. This accomplishes both (*Please turn to page* 225)



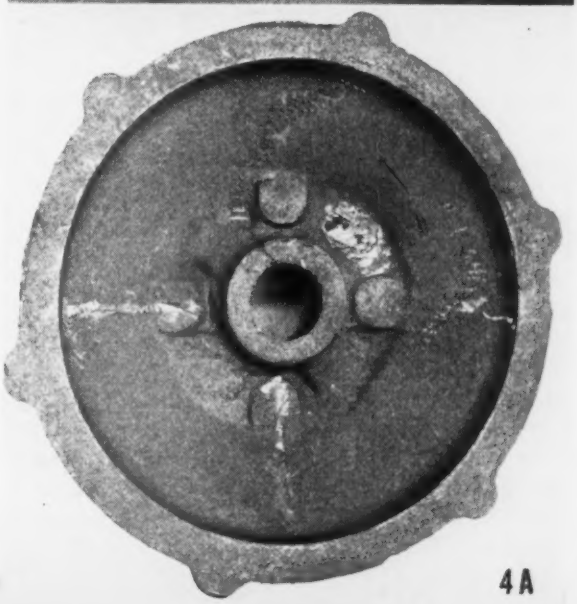


Fig. 4—This shows how crack in a casting appears when viewed under black light after a fluorescent penetrant was applied. Fig. 4A is a view of the same casting when photographed with natural light

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

Gates and Heads FOR STEEL CASTINGS

In this second of a series of articles the author discusses development of step gating, the application of swirl gates, and the principle of partial or complete reversal of the position of the mold after pouring

IN AN EFFORT to reduce the turbulence of the stream of steel entering the mold, the so-called "swirl gate" has been used to a certain extent, especially in English steel foundries. Fig. 7, taken from Briggs,[9] illustrates this practice, Johnson and Baker in an article [10] describing the work at the Naval Research Laboratory, show the effect of swirl gates upon the flow of steel into molds. They conclude that the first metal down the sprue flows around the circumference of the swirl opening, then runs through the ingate. Apparently under these conditions there is less turbulence in the stream actually entering the mold cavity than when the steel flows directly from the sprue to the ingate.

In pouring certain nonferrous metals and alloys it is considered essential that the flow of metal into the mold should be nonturbulent, but it has not yet been shown that the same is true of steel. In the absence of proof that turbulent flow is really harmful in pouring steel castings, therefore, swirl gates have not been used very much in American steel foundries.

In locating gates that lead to the bottom of the mold, every effort should be made to avoid having the entering metal impinge upon cores or portions of the mold that will interrupt its flow. This is important both because the stream of steel is apt to erode the core or mold severely, and because it is desirable that the metal should move forward uninterruptedly and be dammed back as little as possible. Even when the steel is able to run freely, however, there will always be considerable erosion and washing of the sand near the gate, which is exposed for the longest time to the heat of the steel and therefore softens and loses its coherence more than other parts of the mold.

In almost any steel casting, it is easy to find the location of the gate or gates, even after they have been cut or broken off, by looking for the areas where sand has burned to the steel. Not only does this produce a rough surface that may require chipping or grinding if the area in question is to be machined, but it is a sure indication that more or less sand has been washed away and carried into the mold. Some of this loose dirt, or course, will float into the heads, but usually at least a part of it is trapped in the mold to form sandy spots at or near the surface of the casting.

Washing away and burning-on of sand near the gate is worse in green sand or partially dried molds than in dry sand. It may be reduced, though not entirely eliminated, by nailing the affected area heavily, and by giving the sand one or more coats of wash. When the condition is especially bad, split bricks may be set against the pattern to form the surface of the mold, or cores composed of sand containing large amounts of silica flour, such as that of which regular gate cores are made, may be used for the same purpose.

When a core or some portion of the mold interferes with the free flow of the steel, defects in the casting may be produced by other conditions besides the cutting and washing away of the sand. If the steel is able to advance freely and uniformly through the mold cavity, considerable dislodged dirt is carried into the sinkheads, rather than lodging somewhere and forming sand spots in the casting. When the flow in different parts of the mold is uneven, however, the loose sand floating upon the steel at a point where the flow is retarded may become buried under metal that has advanced uninterruptedly through some other portion of the mold and met the slow-moving stream at a point some distance away from the gate.

In pouring the casting shown in Fig. 8, trouble of this sort was caused by an improperly located gate. Steel entering this mold through gates located at the points shown in the illustration, flowed quite freely around the longer path marked (a), but the portion that followed path (b) was dammed back by the core (c), since it could get past this obstruction only through the narrow opening between the core and the bottom of the mold. The steel that flowed along path (a) then filled the mold up to the top of this core, before the part of the metal following path (b) had risen more than a little way up the core. The result was that the metal that had flowed along path (a) soon poured in a cascade over the top of the

core, burying the slower-moving stream and trapping the dirt upon it, so that quite large "sandy" areas were produced. By careful inspection of the castings, it was possible to see the lines of flow of the metal almost as clearly as if the mold had been transparent.

This difficulty readily was remedied by locating an ingate at each side of the troublesome core, so that the steel flowed without interruption around each side of the casting and met while still hot enough to unite readily. The dislodged dirt then floated with the metal and was carried into the annular head set on top of the casting.

As will be described in the discussion of heading practice, bottom gates frequently are arranged so as to feed, not directly into the casting, but into a side-attached head of what is called the Williams type. Fig. 2 (November issue) illustrated this practice, although in this view the runners connecting the bottom of the core sprue to the two heavy heads are not shown. As mentioned elsewhere, these runners preferably should be shaped by pieces set on the pattern board, rather than cut out with the trowel. Then the steel is fed into a head in this way, instead of directly into the mold, the washing and burning on of the sand in the mold is naturally greatly reduced, as it is the head rather than the casting itself that is exposed to the maximum heat of the steel. The passage connecting the head and the casting is usually somewhat larger than the sprue and runners, and is formed in a flat core set between the head and the casting itself.

In pouring castings of circular outline, such as gears, wheels and the like, the steel is often fed into the rim through a bottom gate set tangentially, with the object of making the metal flow around the periphery of the casting, and thus be subjected to the least amount of obstruction. Gates for large steel rolls, which are poured on end and gated at the bottom, usually are set at an angle in this way, not because of possible interference with the flow of the steel, but in order to fill the mold with the least possible turbulence. In gears or wheels with spokes or thin plates connecting hub and rim, the momentum of the flowing steel is so great that it will flow for a long distance, sometimes completely around the rim, before any of it enters the spokes to fill the central hub. As a result, the heads usually placed on the hub will be filled with the coldest metal, and thus will tend to solidify prematurely and feed the casting much less effectively than if they were filled with hotter steel.

The better practice for these castings, therefore, is to use a gate core that delivers the metal upward into the bottom of the hub, whence it flows through

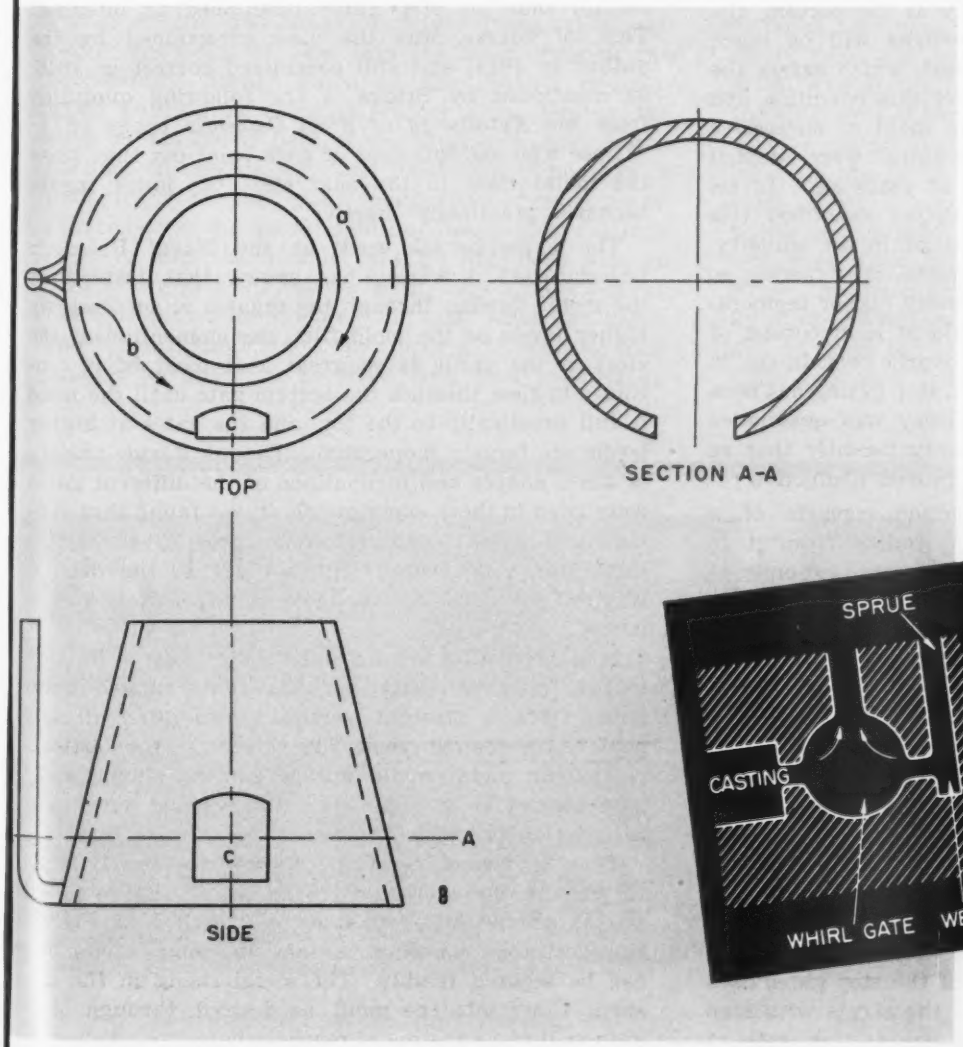


Fig. 7—Swirl gate is arranged so that the metal enters the mold with less turbulence

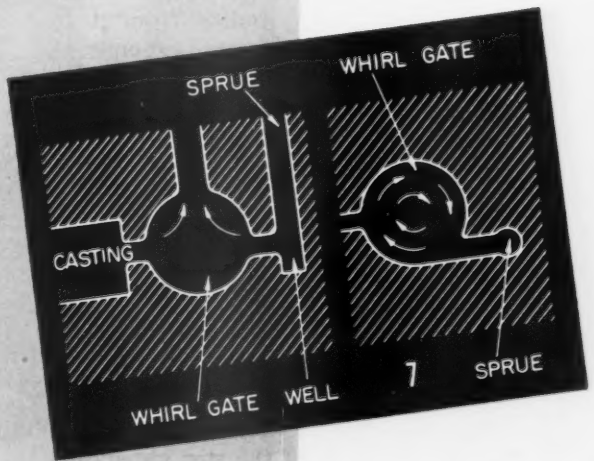
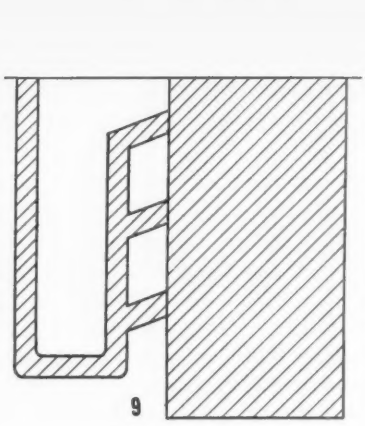


Fig. 8—Use of a single gate in this mold resulted in the trapping of dirt in casting



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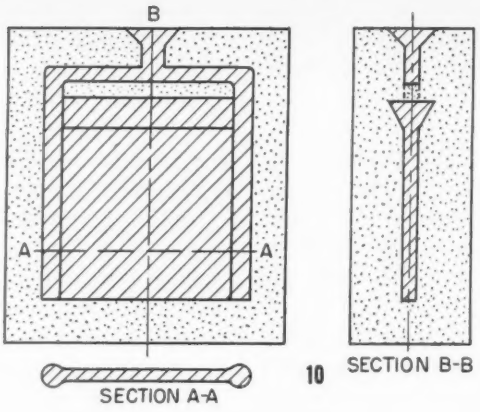

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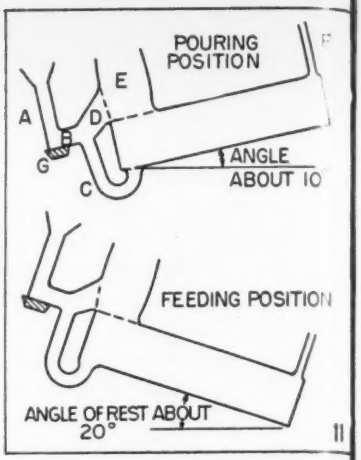

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Fig. 9—Saxophone type of step gate with branches angling upward. Fig. 10 — French gate feeding casting from two opposite sides. Fig. 11—Partial reversal method showing (A) Upper sprue (B) Cross gate (C) Lower sprue (D) Slot gate (E) Feed head (F) Vent (G) Splash

the plate or spokes and then fills the rim. The coldest metal is thus deposited at the point furthest from the heads, so that directional solidification is promoted. In making small castings, the extra cost of these separate gate cores cannot always be justified and despite their disadvantages, horn gates may then be used.

If a high casting is gated only at the bottom, the metal that forms its upper portions will be much cooler than that in the lowest part, which enters the mold last. In an effort to correct this condition and to introduce the metal into the mold in successive layers, what are known as "step-gates" were adopted by some foundrymen a number of years ago. In his 1914 AFS paper, the present author described this method and urged its wider adoption in the industry. As he pointed out, though the metal in a casting so poured would not be of progressively higher temperature from bottom to top, it would at least consist of layers in which hot metal would overlie cold. In the 36 years that have passed since then, step gating has been used widely, and though its efficacy was questioned by some authorities, it is only very recently that as generally practiced it has been proved ineffective.

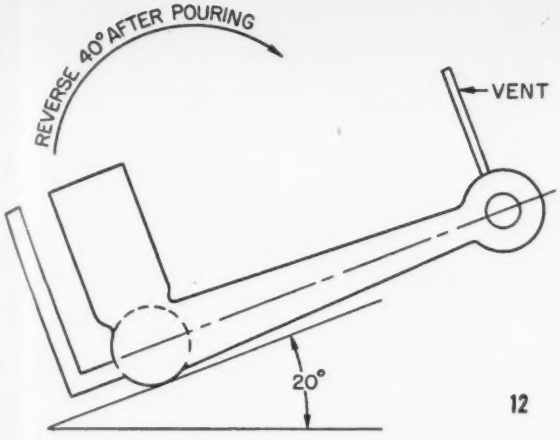
The usual step-gate construction consists of a vertical down-sprue, with gates leading from it to the casting at several levels. A typical example of this arrangement is shown in Fig. 13, taken from a paper by Duma and Brinson,[11] published in 1940. To quote these authors, "The figure shows a large strut casting with a single down-runner or sprue connected to the hub section through three gates. All three of them lie in the same vertical plane, but at different elevations; one at the bottom, one in the middle, and one close to the top. During the pouring of the mold, nearly all the metal in the lower levels is introduced by way of the bottom gate; that in the higher and topmost levels, by way of the middle and top gates respectively."

In discussion, Mr. Brinson gave this answer to a question as to the effectiveness of the step gates used on these struts: "In the case of the struts with step gates, we start with a certain size section gate at the bottom, use a little larger one in the middle, and a still larger one at the top, often angling them up. I have watched these castings poured and watched the metal come into the bottom gate until the metal got pretty well up to the middle gate. Then it came into the middle gate until it got to the top, and then started at the top gate." Obviously, Mr. Brinson felt certain that his step gates functioned as intended. This, of course, was the view entertained by the author in 1914, and still considered correct in 1946, as mentioned by Briggs in the following quotation from his *Metallurgy of Steel Castings* (page 257): "Those who use this type of gate point out that when the metal rises to the next step, the lower ingate becomes practically inactive."

The experimental work at the Naval Research Laboratory[10], however, has shown that instead of the metal flowing through the ingates at successively higher levels as the mold fills, the momentum of the steel in the sprue is so great that most of it continues to flow through the bottom gate until the mold is full practically to the top, and the gates at higher levels are largely inoperative. Though a wide variety of sizes, shapes and inclinations of the different gates were tried in these experiments, it was found that runners and gates leading from a sprue in which the metal flows downward will not act in the desired way to feed metal into the mold at successively higher levels.

It is interesting to note that the late George Batty[12] stated flatly as early as 1934 that "simple step-gates from a straight vertical down-gate will not achieve the desired result. The velocity of the vertically flowing metal would not permit the simple step-gate carried at an angle from the vertical down-gate to function properly".

The experimenters at the Naval Research Laboratory found, however, that by the use of what is called a "saxophone gate," such as is sketched in Fig. 9, the desirable condition sought in using step-gates can be secured readily. The metal rising in the up-sprue flows into the mold, as desired, through each gate in turn as the metal reaches that level. As some-



gate. Fig. 12 — Cross sectional view of 20,000-lb stockless anchor using partial reversal mold

times happens, we had the right idea in 1914, but most of us carried it out in the wrong way.

So far as the author is aware, no information is available in print as to the effect of stopping the pour when a mold with several step gates leading from a vertical down-sprue is partly full, and starting it again when the metal has come to rest. As suggested in the discussion of finger gates, this may cause the metal to flow into the mold through the successively higher gates in the desired manner, when pouring is resumed, rather than forcing the steel in the lower part of the down-gate and in the casting, to resume its flow. That this is possible is indicated by the fact that a foundrymen of many years' experience in the manufacture of heavy steel castings recently told the author that he had been able to make two-level step-gates with only a down-sprue work properly, by stopping the pour when the metal had reached the level of the upper gate, waiting long enough for the flow to cease, and then opening up the nozzle again. Because the momentum of the stream was not great enough to evercome the inertia of the steel in sprue and mold and start it moving again, the metal then flowed through the upper gate. To time such an operation properly, however, is not too easy, so that the better practice is to use the saxophone type of gate. At least some practical foundrymen, as well as technical experimenters, have learned that in step-gating, the ingates should be fed by up-sprues, as is shown by Fig. 61 of the author's article in FOUNDRY for March, 1949, page 95. The steel is carried into this casting by a sprue connected to a runner feeding into the lower edge of the piece, which in turn delivers metal to vertical sprues supplying ingates at two higher levels. The same general method is widely used in designing the tile sprues and gates through which the steel is poured into large steel castings such as steam turbine castings, spectacle, and stern frames for ships, to mention but a few in that category.

In an effort to secure complete soundness in flat plates about 2 in. thick and several feet square, a number of steel foundries have used the so-called "French gate." These plates were poured on end rather than in a horizontal position, and the steel was fed down two passages connected to them throughout their length, as indicated in Fig. 10. In the smaller sizes, these castings were molded in cores, which were supported between two stiff steel plates clamped together. The steel filled the mold progressively from the bottom upward, so that the coldest metal was at the bottom of the mold, the hottest in the sink-head at the top. The object sought, of course, was to ensure that the freezing contraction of each layer of the piece would be compensated by the hot steel above it, and thus a completely sound plate would be produced. These castings were probably the best that could be obtained from a pattern of such shape, but were never entirely free from the discontinuities known as "center-line shrinkage," which will be described later.

Though steel foundry men for the most part ad-

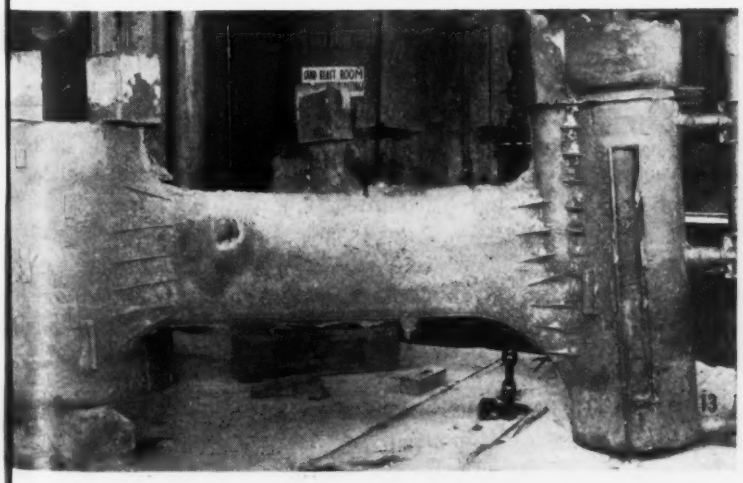


Fig. 13—Two-arm strut, as cast, showing step gating at right, riser and outside padding

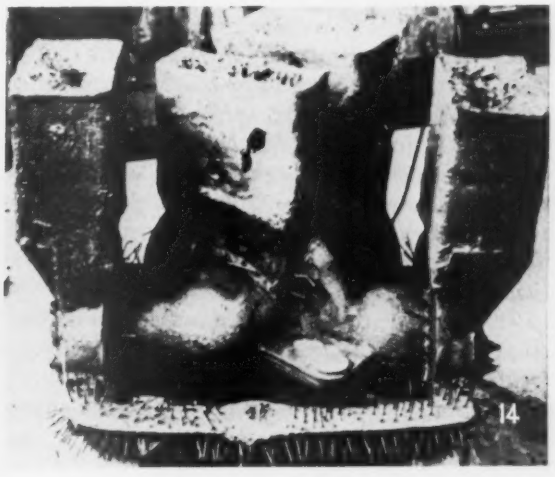


Fig. 14—Seven-in. valve body illustrating control of solidification by the heading

here to plain bottom gating, or at least to modifications of step-gating that introduce the first part of the steel at the bottom of the mold, other styles of gating are used to a certain extent. The commonest example of this is the gate located at the parting line between drag and cope. Fig. 14, from the paper by Duma and Brinson[11] referred to previously, shows a valve body casting gated in this manner, and Fig. 15, from the same source, a turbine casing in which the steel is fed into the heads, through tiles set at the parting line of the mold.

In the latter example, the steel is introduced into the casting itself from the top down, the hottest metal of all being in the heads, where it should be. The down-sprue is set at one end of the casting. In the light of recently acquired information, the arrangement of these runners and gates is open to the objection that a large portion of the steel will flow to the two gates farthest from the down-sprue. Those gates, therefore, will carry more steel, but colder steel, than the ones close to the sprue, so that there will be a considerable temperature differential between the ends of the piece.

Metal Stream Impinges on Core

At the same time, the streams of metal entering the mold impinge upon the core that shapes the inside of the casing, and will tend to erode it. As indicated above, there is no way to completely prevent the erosion of this core sand, so that a certain amount of it is bound to be carried into the mold. If the rods or arbors used in this core would permit, the sprue and runners should be set in the core, rather than in the drag, and the sprue could then be placed in the middle of the mold, so that the steel would flow in two directions to the several runners and gates. This would give a more even temperature distribution in the casting, but the erosion would merely be shifted to the sand of the mold instead of that of the core.

In general, too, whenever possible it is better to place the runners inside rather than outside a casting of this type, so that the casting may contract inward upon the gates rather than pull away from them. Being smaller than the casting, the gates, especially when located outside the piece, solidify first. They are therefore comparatively rigid by the time the casting is contracting at the maximum rate, so that the contraction of the casting is resisted by the rigid runner structure. In extreme cases pieces of the casting will be torn out at the ends of the gates, or major cracks will be formed in the piece. If the runners and gates are on the inside, they will usually not cool as fast as when they are outside the casting, so that there is not much difference between the cooling rate of casting and gates. Moreover, with the gates so located, the casting shrinks toward rather than away from them, and it is only in the early stages of contraction that tensile stresses will be set up. Whenever possible, hollow cylindrical or cone-shaped castings should be gated in this manner.

Sometimes it is impossible to locate the sprue and gates in such a way as to avoid creating tensile stresses when the casting cools and contracts. An

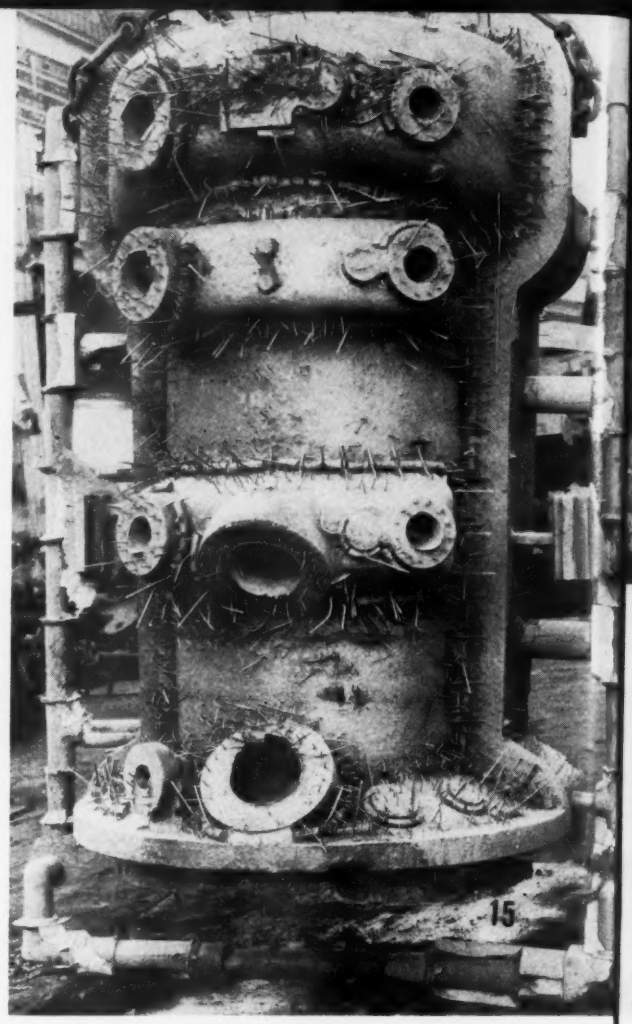


Fig. 15—Top half of a high-pressure turbine casing illustrating the application of chilling for controlling the solidification

old foundry device to minimize the "pull" of the casting on the gate is to make the latter S-shape instead of straight, with the idea that a gate of that shape will "give" and partially straighten out under the tensile stresses. In the author's experience, however, such a gate "pulls" on the casting about as much as if it were straight. An effective means of preventing the gate from tearing the casting under these circumstances is to cut through it a few minutes after the mold is poured, and thus separate it from the casting entirely. This is accomplished by molding a sharp-edged flat bar of steel in the drag, with its cutting end a few inches above the gate, and setting a heavy steel rod over it in the cope sand. The rod is driven down with a sledge hammer, and forces the cutting bar through the gate. Obviously, this must be done as soon as the steel in the gate has solidified, and while it is still quite weak.

Gates at or above the parting level of the mold have the advantage of placing the metal that has run the farthest over cold sand, and hence has cooled the most, at the bottom of the mold, and the steel which enters the mold later, over sand heated by the first metal poured, in the upper portions of the mold. This, of course, is theoretically correct, as it permits the hotter metal above, which solidifies late, to feed the contraction that takes place in the

Fig. 16—Gate and feedheads attached to shank for a stockless anchor weighing 20,000 lb

lower layers when they solidify. Offsetting this advantage is the erosion of the sand of the mold by the flowing metal. If the steel falls freely for a considerable distance and strikes directly upon the bottom of the mold, the erosion may be severe. If it strikes cores or portions of the mold, erosion will be less marked, but will still occur. When the steel merely flows down a sloping surface, the effect on the sand will be even less pronounced; in fact, the conditions in that case are the same as those in a flat-bottomed mold, gated on one side at the bottom, which is tipped up at the gate end, so that the metal will flow down-hill and hence more readily fill fine details.

Finally, in some cases a steel casting may be poured entirely from the top usually through a number of "pencil gates" in the bottom of a pouring basin or cup, somewhat in the same way that cast-iron bathtubs are produced. Usually these small openings discharge the steel into the risers set on the casting proper, but when pouring begins, the metal of course must strike directly upon the bottom of the mold. In some shops sheaves of quite large diameter are poured in this manner through a number of pencil gates in a basin placed over the heads set on the hub. In these pieces the steel falls not over a couple of feet from the bottom of the pouring basin to that of the hub, and erosion by the comparatively small streams is not great. The old-fashioned steel foundryman would probably gate these pieces into the bottom of the hub by means of a gate core and downsprue, and pour the heads separately from the top after the casting proper was filled. With sufficiently hot and fluid steel, however, the pencil gate method is quite satisfactory.

Though he disclaimed the credit for the orignal conception, the late George Batty developed and introduced in American steel foundries the principle of partial or complete reversal of the position of molds after pouring. This practice he described in a paper[12] presented before the American Foundrymen's Society in 1934. In essence, the method consists of gating a casting at the bottom, so as to avoid the difficulties inherent in top pouring, placing the heads as well as the gates at the bottom, and turning the mold over after pouring so as to bring the heads and the hottest metal above the rest of the piece.

In explaining his method, Mr. Batty pointed out that, in plain bottom gating, not only is the hottest metal at the lowest portion of the piece, but the sand at the position, having been exposed the longest to the flowing metal, is hotter than that at other parts of the mold. The hottest steel, surrounded by the hottest sand, naturally loses temperature much slower than the cooler steel in the higher levels of the casting. By turning the mold over after pouring, the hotter and slower cooling metal is placed where it is wanted, at the top.

To turn the molds upside down, a crane must follow the pouring ladle and pick them up as fast as they are poured, or the flasks must be mounted on trunnions and so supported as to be readily turned over at the proper moment. In certain cases castings as heavy as 3 tons have been produced in this manner[13], but the difficulties involved in carrying it out have kept the complete reversal method from being adopted on a large scale.

The partial reversal method, while perhaps not as completely effective as total reversal, is far easier to apply and has been used considerably to produce a wide variety of steel castings. Fig. 11 from Mr. Batty's original paper, illustrates the application of the partial reversal method to a piece of simple shape. As the figure shows, the casting is poured "up-hill," which helps to bring loose dirt to the pop-off at the far end of the mold. The gating system illustrated permits the first metal to enter the casting, and the later-poured steel to flow into the head. By reversing the slant of the mold, the head and the hotter metal are brought to a position above the rest of the piece, so that feeding of the solidification contraction is promoted. Gating of the type shown, as Mr. Batty pointed out in the paper, though expensive, can be advantageously applied, even if the mold is not to be turned over.

The method used to reverse the mold partially is quite simple, the flask being set on blocks near its center, and supported by higher blocks at the end away from the gate. To reverse its position, the higher blocks are removed and one or two men with bars reverse the tilt of the mold and set blocks under the gate end. (*Please turn to page* 192)

OBSERVATIONS ON Bronze

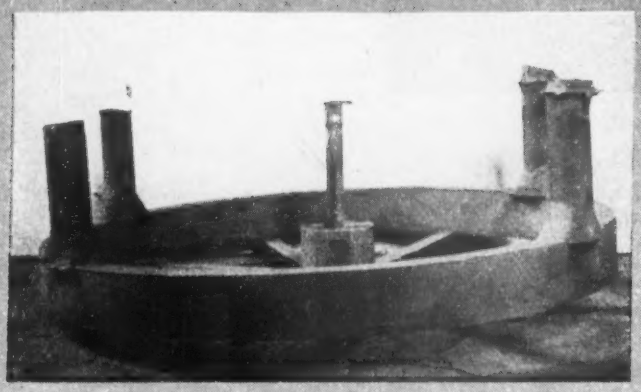


Fig. 1—Ring casting, 24-in. OD, showing riser and sprue location

Fig. 2—Bottom view of casting and seven radii leading from the sprue

Fig. 3—Top view of the ring casting

THE OTHER day I visited a foundry that was having trouble with a ring casting. This casting was 24 in. OD, 20 in. ID and the height 4 in. The metal was silicon bronze with 1.0 per cent lead. The ring had to machine up all over with complete absence of dross or shrinkage either external or internal.

The first attempt had been to cast the ring flat, the metal entering at one point at a tangent. The result was a fairly good-looking casting as it came out of the sand but with some evidence of external shrinkage here and there on the cope side. On machining, however, considerable dross was found just under the skin. This also was distributed at intervals on the cope side.

It was realized, of course, that the presence of the lead greatly complicated matters, owing to the formation of lead silicide. However, the lead was required by the customer for ease of machining.

The second attempt had been to pour "two up" in a manner similar to that of the first casting but adding three risers at equidistant points on the circumference.

The pouring temperature for both castings had been 2000° F. Melting had been done in an electric furnace, and the metal used was silicon bronze composition ingot purchased from a reliable smelter. No charcoal or flux was used during melting, but on tapping the furnace ¼ lb of 15 per cent phosphor copper was placed in the bottom of the ladle. The pouring temperature as the metal entered the ladle was 2100° F. The metal was left in a state of quiesence for five minutes, then gently stirred and skimmed, and the mold filled at 2000° F. A control keel bar that had been poured with each casting gave entirely satisfactory results as to fracture and physicals.

It seemed, therefore, that the trouble was not in the metal but in the reaction between metal and mold and mold atmosphere, and especially in the method of entry into the mold.

The sand used was Albany Nos. 1 and 0 in equal amounts, and the moisture just 6 per cent. The mold was of green sand and was closed with a flat cope.

A general discussion took place between the foundry foreman, the molder and the metallurgist, with the result that the following method was employed for the third casting.

By HAROLD J. ROAST
Foundry Consultant

Foundry Practice

To reduce dross entry the metal was poured into a basin having a capacity to take all the metal required and enough over to avoid entry of dross at the last moment. The basin was suitably plugged so that when the pouring temperature had arrived the metal readily could be let into the mold. This is shown in Fig. 4. Entry was by means of a down sprue in the center of the annular space outlined by the ring. From this seven radii ran into the casting proper (Figs. 2 and 3), but the entry was from beneath in each case so that maximum quietness might be obtained. Four risers (Fig. 1) were placed equidistant around the circumference.

The basin was filled with metal at 100° over the desired pouring temperature. When the right temperature was reached, as tested by a standard pyrometer (checked every week), the plug was pulled and the metal flowed into the mold. The method employed permitted hot metal to come up in all risers so that they were able to function efficiently, both as to feeding the casting and catching dross formed within the mold.

The result was a ring that, after machining all over, appeared perfect. To examine the internal condition the casting was fractured several times. All fractures were clean and uniform, showing absence of shrinkage and dross. Many other castings were made by this method and were equally satisfactory.

On another occasion I was in a foundry that had no heat treating equipment but had just received an order calling for heating the castings to 1560° F, then quenching in oil, and drawing back at 1200° F.

The alloy was a 5 per cent nickel, 10 per cent aluminum bronze. The physicals required after heat treatment were: Yield strength 18,000 psi minimum; ultimate strength 45,000 psi minimum and elongation 10 per cent minimum.

It was thought that advantage might be taken of the self annealing features of this class of alloy. In due course one of the inspectors for the customer came to the foundry to witness the heat treatment. The castings, which were sealing collars, were made in green sand. Metal was poured at 2100° F after being melted in an electric furnace. Composition ingot was used.

Immediately after pouring and as soon as the castings were solid (the time required had been established by experiment), they were taken out of the sand and scraped with suitable iron scraper so that most of the sand was removed. The bright-red castings were then left to cool on the foundry floor. The inspector asked when they would be heat treated and he was informed that the heat treatment was then being conducted. He objected at first but finally agreed to await the results of a test bar that had been treated in exactly the same way.

When the castings were cold three were taken at random and fractured and brinelled. The test bar gave what to the inspector were astounding results, namely: Yield strength 49,125 psi; ultimate strength 97,750 psi, elongation 10 per cent. Taking these figures into consideration as well as the fractures of the representative castings, the inspector was satisfied to allow the rest of the order to be filled in the same manner. Over 600 sealing collars were made by this method.

Lead must be under 0.10 per cent for this treatment to be effective.

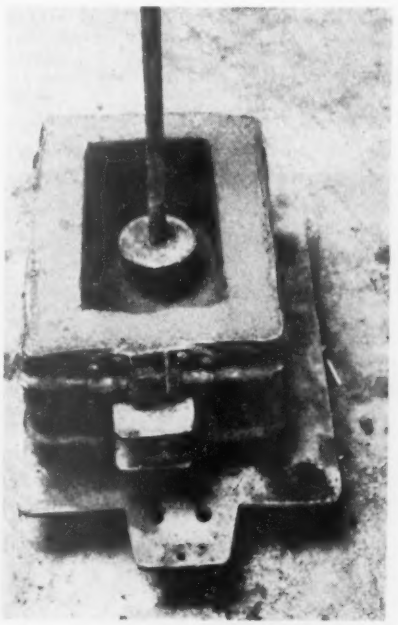


Fig. 4—Capacity of the plugged pouring basin is sufficient to fill mold completely with metal

By J. C. McGEE
Research Division
Wright Air Development Center
Dayton, O.

ML Aluminum Alloy—

A Material for Elevated Temperatures

Design of new aircraft has intensified the need for aluminum castings suitable for use at elevated temperatures. An aluminum alloy, discussed here, has been developed by the Air Force and reportedly possesses one-third better properties than older elevated-temperature alloys

A NEW light metal casting material—ML aluminum alloy—has been developed by the Air Force for use in elevated temperature operation. It has properties approximately one-third better than older elevated temperature aluminum alloys. The need for such aluminum alloy castings has been apparent with the design of new aircraft. Casings, supports, and many other parts which formerly operated from 200° to 300°F will be designed in the future for temperatures of from 500° to 600°F.

The problem of developing an aluminum alloy with better 500° to 600°F properties was attacked at the Materials Laboratory at the Wright Air Development Center, Wright-Patterson Air Force Base. The first step was to study all the alloys used by different nations for elevated temperature work, and then strive for a material with better properties.

The known alloys tested and the properties obtained are listed in Table I. From this group four were chosen as being basic. They were Y alloy, Hydronalium 511, RAE 55, and DCK, a theoretical laboratory alloy. Many melts based primarily on variations and combinations of elements of these four materials were made. Their physical and mechanical properties were evaluated.

It was observed that during elevated temperature tests, failure started in numerous places for some of the compositions. This phenomenon was arbitrarily called surface tear and was classified, as shown in Fig. 1, from none to extreme. Surface tear was considered to be undesirable, since alloys which exhibited this condition were found to be poor in creep. The preliminary work also revealed that manganese, in excess of 0.3 to 0.4 per cent, and several other elements were considered undesirable since they imparted poor thermal conductivity to the castings.

A plan of microscopic study was carried out on each of the melt variations. The fractures of the room temperature and hot tensile tests were carefully examined visually at low and high magnification to determine the manner in which the samples failed, and the effect of the matrix and constituent material on the strength. As a result a partially cellular constituent, such as that shown in Fig. 2, was sought which would act as a reinforcement, and minor or trace amounts of hard elements, which have partial solid solubility, were added to strengthen the matrix. For copper, magnesium, nickel, major elements, the most advantageous minor additions were found by test to be 0.3 per cent manganese, 0.3 per cent chromium, 0.05 per cent vanadium.

ML Alloy—The alloy chosen from the experimental melts had considerably higher short time 600°F tensile properties than any other aluminum alloy in general usage. The manner of fracture at temperature was similar to a normal ductile material at room temperature without the notch effect of surface tear. The room temperature properties were good, and the toughness as indicated by impact tests was satisfactory. The room temperature properties were similar to Y alloy (142), and the casting properties did not

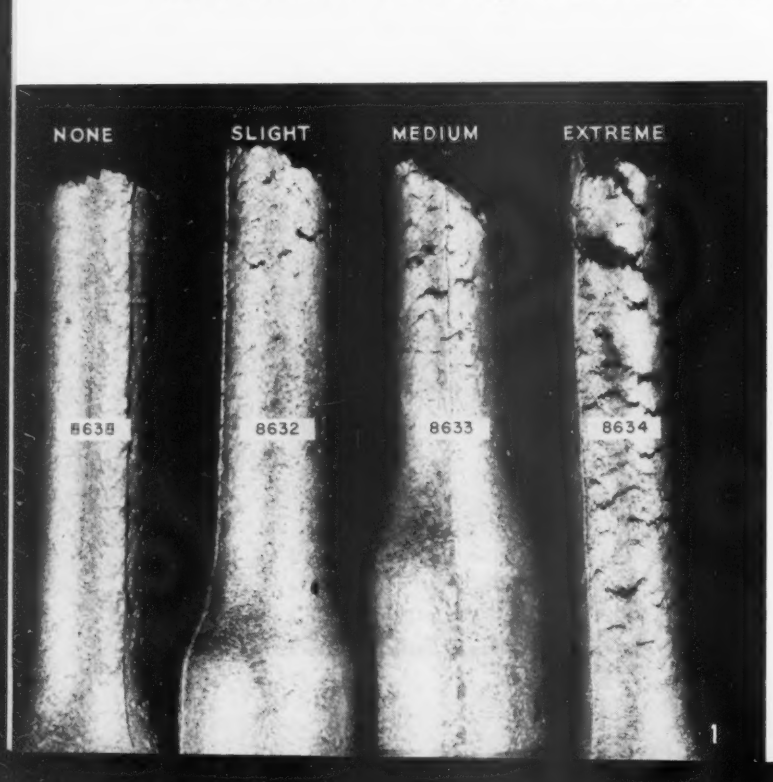


Fig. 1—Classification of surface tear for specimens in tests at elevated temperature

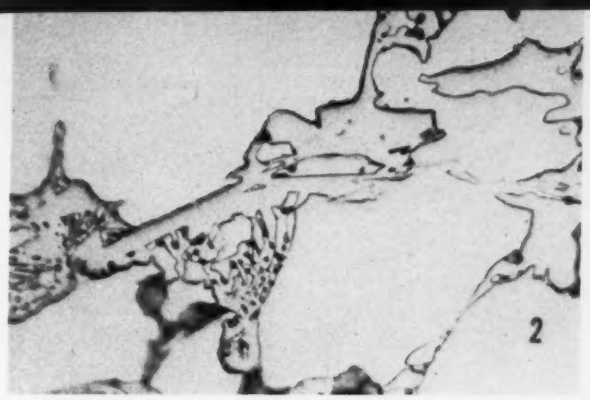


Fig. 2 — Partially cellular constituent in the alloy matrix acts as a reinforcement

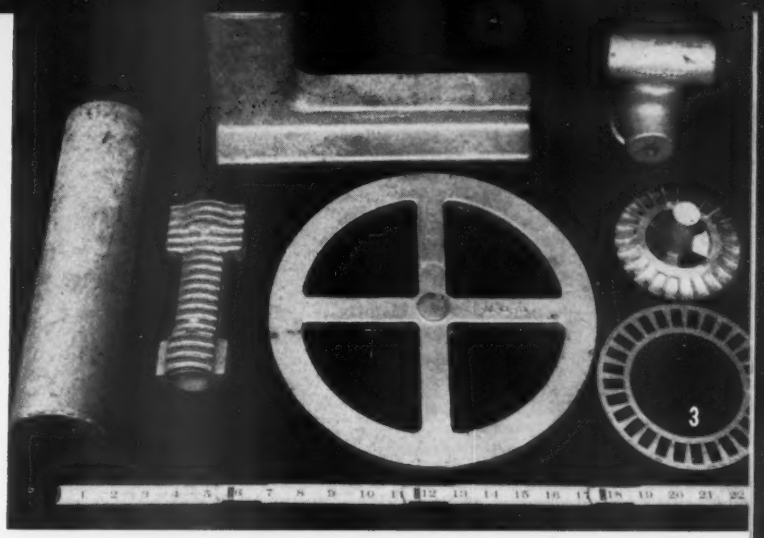


Fig. 3—Typical castings made from ML alloy

differ too much. The microstructure was considered to be ideal. It consisted of a strong matrix or solid solution material reinforced with partially cellular network constituents. The name given to this casting material was ML aluminum alloy.

Properties—The typical as-cast tensile strength at room temperature of ML alloy is 33,000 psi with a yield strength of 31,000 psi and elongation of 1.2 per cent in 2 inches. The 400°F properties of the material, the tests being made at that temperature after being stabilized at temperature for 72 hr, were 29,300 psi ultimate tensile strength, 27,400 psi yield strength with 1.5 per cent elongation in 2 inches. Tests made at 600°F after 48 hr stabilization at that temperature showed typical properties of 16,900 psi ultimate tensile strength, 14,500 psi yield strength, with 9 per cent elongation in 2 inches. The 600°F tensile strength after 1200 hr stabilization at temperature was found to be 14,250 psi with very little indication of further reduction in strength.

ML alloy can be heat treated with a considerable gain in room temperature and 400°F properties. However, usage at 600°F destroys the effect of heat treatment. After solution heat treatment at 950°F for 2 hr, quench, and age at 250°F for 40 hr, room temperature tensile strengths of 42,000 to 46,000 psi were obtained. The properties in this respect were somewhat similar to Y alloy (142). The room temperature tensile strength of the alloy after stabilization at 600°F was 29,000 psi. Temperatures above 650° or 700°F reduce the room temperature strength to 26,900 psi, the lowest found for this alloy.

All of the results reported so far were made on test bars as-cast with skin on. Removal of the as-cast skin reduced the ultimate tensile strength at 600° F by 1000 to 2000 psi, the lowest reported being 15,000 psi with 6.5 elongation in 2 inches. No definite reduction in properties was noted when skin was machined from the test bars and then tested at room temperature. Test bars machined from a 3.5-in. diameter casting were found to have 600°F tensile strength of 14,300 psi down to 12,200 psi with a minimum of 4 per cent elongation at the center.

Melting Practice — The melting practice varies slightly from the normal when making castings. To obtain the desired microstructure and consequent properties, it was found necessary to melt the metal and then to hold it at 1500°F for 30 minutes prior to chlorination or other degassing treatments. The best pouring temperatures were found to be in the range of 1325° to 1375°F. The highest tensile properties were obtained in this range although, from the viewpoint of fluidity, castings could be poured satisfactorily as low as 1275°F. Sound castings were no more difficult to make in ML alloy than in Y alloy. Foundries experienced in pouring 142 aluminum alloy will find that ML aluminum alloy can be handled similarly.

Examples of castings made from ML alloy are shown in *Fig.* 3. Other foundries have cast large complicated parts and have (*Please turn to page* 195)

TABLE I — Mechanical Properties of Standard Aluminum Alloys

Designation	Tensile Strength psi		Elongation % in 2 in.	
	Room Temp	600°F	Room Temp	600°F
"Y" Alloy	33,400	13,000	1.0	8.5
"X" Alloy	27,200	9,600	3.0	20.0
"X" Alloy	28,800	9,800	3.0	20.0
HY 511	27,000	12,000	4.5	60.0
Ceralium	33,300	13,000	1.0	16.0
RAE 55	30,500	15,000	1.5	3.0
DCK-1	30,000	12,000	1.2	9.0
DCK-2	30,000	15,000	1.0	5.2
QM 59	24,600	12,400	2.0	22.0
RR 59	29,700	10,500	1.2	11.0
Japanese	30,600	11,000	1.0	70.0
RR 53C	29,500	7,000	8.0	27.0
Avional	29,500	9,100	1.0	16.0
Silumin	23,600	8,200	4.5	20.0

TABLE II—Mechanical Properties, ML Alloy

	Temperature of Test	Properties
As-Cast		
Typical tensile strength	Room	33,000 psi
Yield strength	Room	31,000 psi
Elongation, % in 2 in.	Room	1.2%
Minimum tensile strength	Room	30,900 psi
Maximum tensile strength	Room	36,400 psi
Tensile strength	400°F	29,300 psi
Yield strength	400	27,400 psi
Typical tensile strength	600°F	16,900 psi
Yield strength	600	14,500 psi
Elongation, % in 2 in.	600	9.0%
Minimum tensile strength	600	16,150 psi
Maximum tensile strength	600	17,300 psi
Tensile strength after 1200 hr stabilization	600	14,250 psi
Tensile strength after solution heat-treatment and age	Room	44,000 psi
Machined (Skin Removed)		
Minimum creep rate 0.002%/hr	600°F	4,100 psi
Stress rupture, 1000 hr	600	6,600 psi

Nominal composition: 4% copper, 2% nickel, 2% magnesium, 0.3% manganese, 0.3% chromium, 0.05% vanadium, 0.1% titanium, in aluminum base.

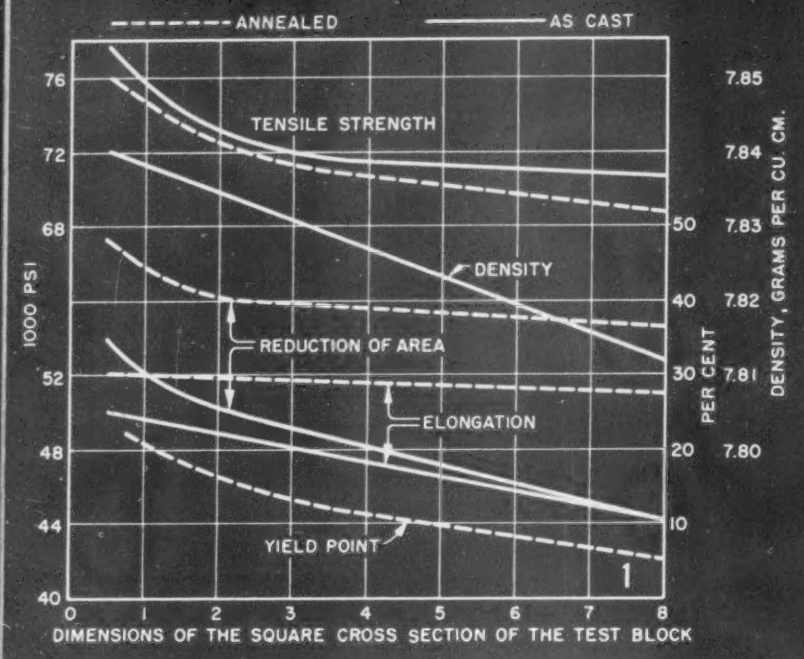


Fig. 1—Effect of mass on the mechanical properties of cast carbon steel (Briggs and Gezelius)

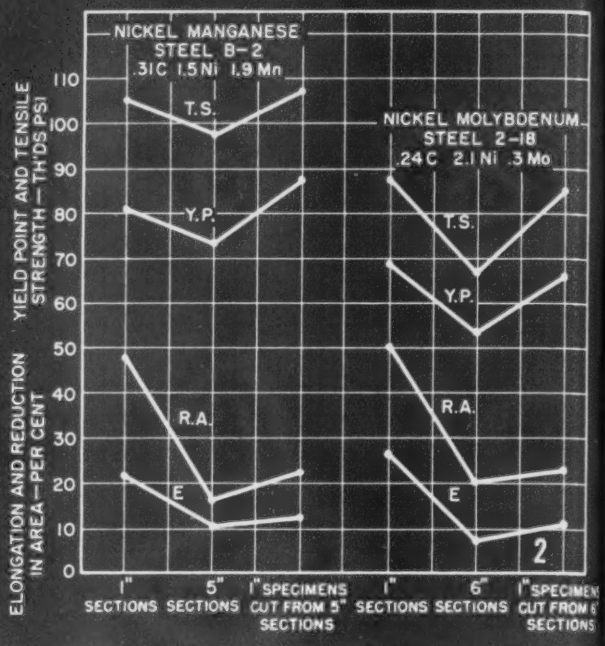


Fig. 2—Mechanical properties of light and heavy sections and separately heat-treated specimens

By T. N. ARMSTRONG
Development and Research Division
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Factors affecting the *Quality of Cast Steel*

IN PRODUCING steel castings, mechanical property requirements of the conventional commercial specification usually do not present a major problem. Strength and ductility limits are based on minimum values that may be met consistently by exercising controls normally imposed in any well regulated manufacturing process.

With increasing frequency the foundries are being confronted with specifications in which the ratio of ductility to strength is higher than generally required. Notched bar impact requirements also are being included for certain types of castings and test results required not only at room temperatures but at low temperatures as well. Other specifications call for very high strength values, a high order of ductility and a selected level of impact properties at moderately low temperatures; a combination of properties that can be secured in steel only by hardening fully on quenching prior to tempering.

Perhaps the most exacting specifications for cast ferritic steel are those in which a required level of Charpy impact values must be met at temperatures as low as minus 150°F, without resorting to liquid quenching and tempering heat treatments. Other specifications call for a relatively high order of mechanical properties to be determined by testing specimens removed from the interior of relatively heavy sections rather than from testing conventional test coupons.

To meet these exacting requirements considerable effort must be directed toward quality control. The foundry metallurgist is becoming increasingly aware that melts that will meet the strength and ductility requirements of the typical commercial specification are not adequate when a high ratio of ductility to strength is desired or when notched bar impact properties, particularly at low temperatures, are specified. The inference is not that the typical commercial specification is not sufficiently restrictive to obtain a satisfactory product. Records of successful experience over long periods have proved the merits of these specifications. Rather, it is intended to call attention to the fact that special consideration must be given to making cast steel melts that must meet high quality standards for mechanical properties.

The foundryman does not have the freedom of control of the mechanical properties of the steel, once it solidifies, that is enjoyed by producers of some other steel products. The inherent quality of the steel as it freezes in the mold is what he must accept and al-

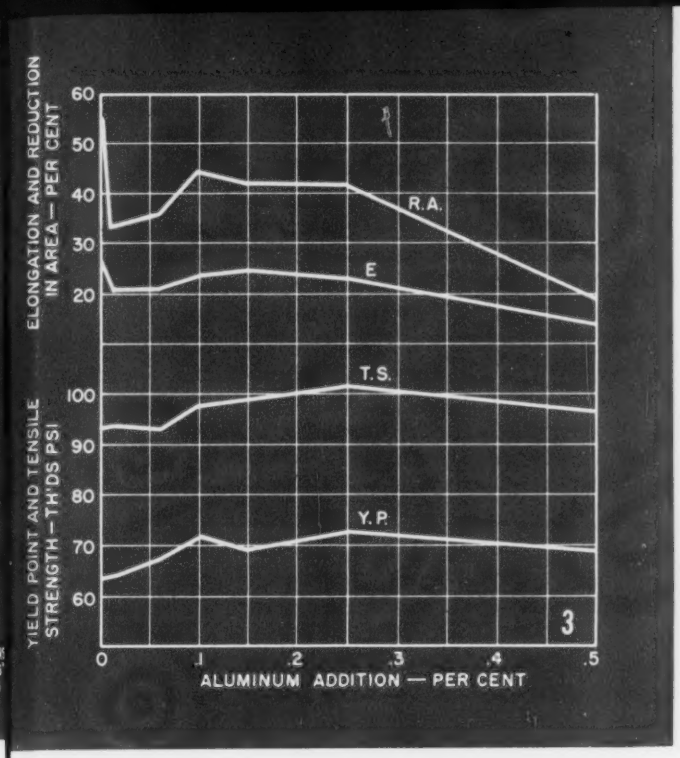


Fig. 3—Effect of aluminum on mechanical properties of normalized and tempered cast steel (Gagnebin)

though the properties may be modified by thermal heat treatment, the limiting factors are composition, density, segregation, and arrangements of nonmetallics in the as-cast condition.

Probably there is as much controversy over density as over any other one property. Density is related to fluidity, to feeding and to section size. Great improvements have been made in feeding castings through the application of the principles of controlled directional solidification, by means of blind risers employing atmospheric pressure and by means of exothermic compounds in risers. However, it has been clearly demonstrated in the work of Briggs and Gezelius[1], Fig. 1, that even under ideal conditions of solidification there is a decrease in density and a corresponding decrease in mechanical properties, with the exception of impact, with increase in mass. This decrease in density appears to be related to interdendritic shrinkage, which is inevitable in the center of large masses. Because the worst condition is along the center line, specimens taken from this location do not truly represent the quality of the metal.

Due to the relatively long time for solidification to occur, nonmetallic inclusions are larger and are more likely to be located in the primary grain boundaries than in sections that freeze relatively fast. These massive inclusions have an adverse effect on mechanical properties, particularly ductility, and may affect impact properties. The fact that primary structure rather than effectiveness of heat treatment is responsible is shown in Fig. 2. If test results are required on specimens removed from heavy sections, the specimens should be taken from a location midway between the surface and the center to truly represent average properties of the section.

The work of Sims and co-workers with aluminum additions to cast steel[2, 3] led to development of a deoxidation practice that would give generally consistent results. As indicated in Fig. 3, small aluminum additions affect ductility adversely. Ductility recovery occurs with an excess of aluminum but, unfortunately, complete recovery is never obtained in aluminum-treated steels. The mechanism is associated with both presence of iron oxide and form of sulphide as indicated in Fig. 4. Fluidity as a function of iron oxide is shown schematically in Fig. 5, and the same relationship appears to hold for iron oxide and ductility, disregarding the effect of sulphur. Unfortunately, a compromise must be made, as a low-oxide content is necessary in steel for castings to secure soundness and there appears to be no substitute for aluminum for insuring soundness in castings made in green sand molds.

While excess of aluminum will control the form and distribution of sulphides, condition of the melt before the aluminum addition and the sulphur content also have a decided influence on mechanical properties. The higher the sulphur content, the lower the ductility. This is illustrated in Fig. 7 which includes results from a large number of production melts.[4]

The degree of oxidation during meltdown has been recognized for some time as a factor in quality of both the metal and the casting. Oxidation in the acid practice does not decrease either sulphur or phosphorus but it does rid the metal of dissolved

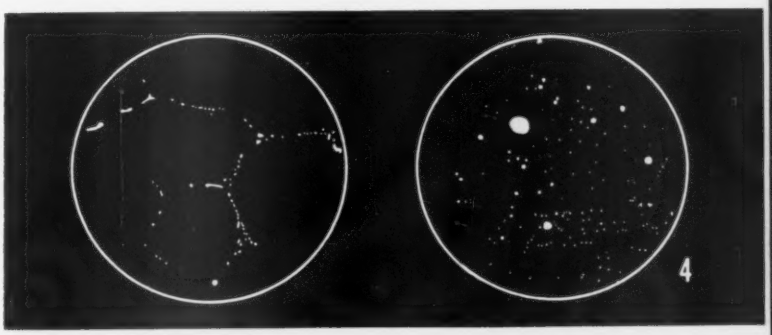


Fig. 4—Effect of aluminum and of iron oxide additions on sulphide form and distribution

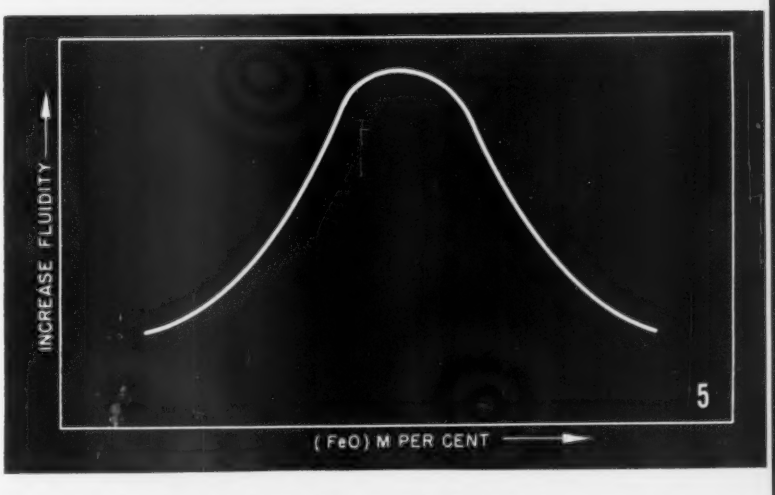


Fig. 5—Illustrating the general relation of iron oxide content to fluidity (Briggs)

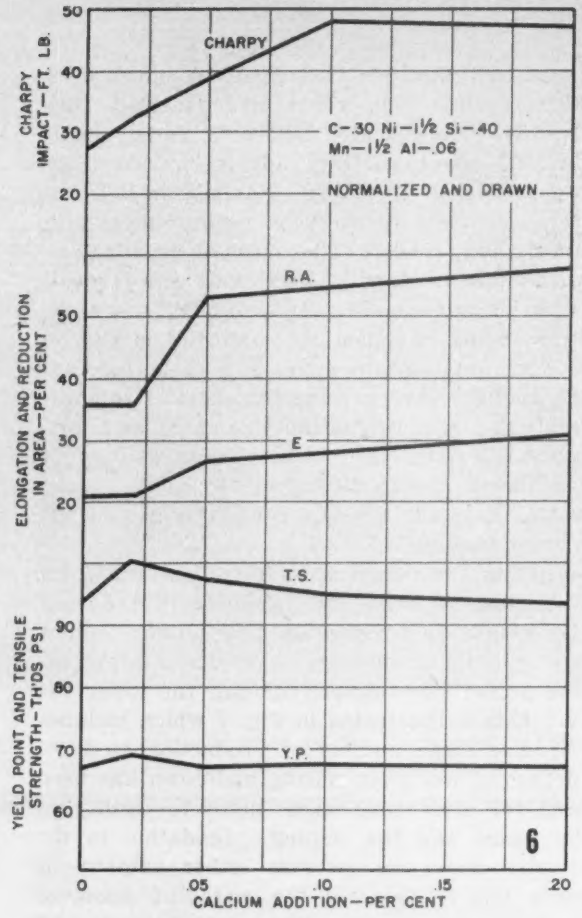


Fig. 6—Effect of calcium on mechanical properties of aluminum deoxidized cast steel (Gagnebin)

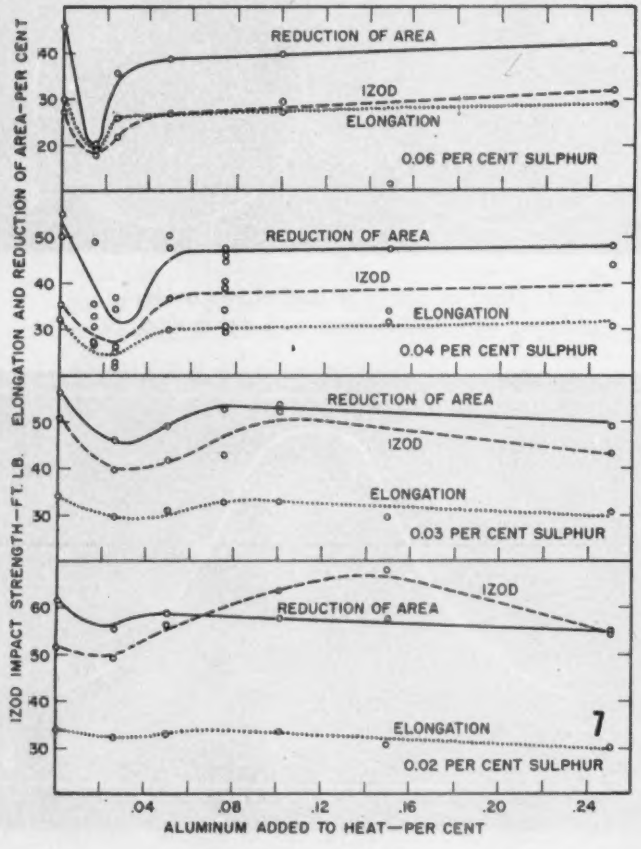


Fig. 7—Effect of aluminum on the ductility and impact properties of cast steels of different surphur content (Troy)

gases and also appears to affect the final sulphide form.

Attempts have been made[5] to find an addition agent which would insure consistently high values of ductility regardless of the manner in which the melt was produced and independent of whether silicon or silicon and aluminum were used in deoxidation. The values in Fig. 6 show that through the use of calcium, in the form of calcium silicon alloy, some improvement in ductility was obtained but the degree of deoxidation during meltdown was found to be a factor. Subsequently, it was established that selenium would improve ductility[6] and although results secured on small experimental melts were quite spectacular, experience with production melts indicated that the condition of the melt prior to the selenium addition was still a very important factor. Effect of selenium on mechanical properties is shown in Table I and the effect on the type of sulphide inclusions is shown in Fig. 8. A recently published report[7] indicated that selenium additions were justified for premium melts.

Aluminum May Cause Precipitate

In addition to modifying ductility by its action on sulphides, aluminum also may affect ductility by a precipitation phenomenon. This precipitate frequently causes cracks that follow the primary grain boundaries and generally are referred to as "rock-candy" fractures, or conchoidal fractures. There is considerable evidence[8] that these cracks are due to precipitation of aluminum nitrides, resulting from relatively high nitrogen content and an excessive amount of aluminum. The condition is not always reflected in surface cracks and may not be detected until a specimen is fractured. Fig. 9 shows a typical conchoidal fracture in an impact specimen. The remedy is either lower nitrogen content, or lower aluminum content, or both. Melting with a vigorous boil and short time in the furnace after meltdown are conducive to low nitrogen absorption.

It should be recognized that it is not the quantity of aluminum added but the residual aluminum that is important, and only a slight amount over the quantity required for deoxidation is necessary for best results. The time elapsing between the aluminum addition and the pouring of the casting also is important, as shown in Table II.

In the production of high-strength castings, particularly when relatively high ductility and impact values are specified, the problem is to select a composition that will best meet the requirements consistently. The first consideration should be to select an alloy composition that has sufficient hardenability to insure freedom from pearlite and high temperature bainite on quenching. Also, as shown in Table III, the lower the carbon level that will permit meeting the hardness requirements, the higher will be the ductility and impact properties. The general requirements and the importance of the cost factor will determine to what extent alloys can be used to replace carbon.

The difficulty of meeting low-temperature impact requirements in cast steel subjected to normalizing

and tempering heat treatments has been the subject of much study. Although carbide form and distribution have considerable influence, results indicate that the most frequent cause for low values is sulphur. Small irregularly spaced sulphides in the grain boundaries have little effect on tensile properties but do have a very adverse affect on low temperature impact properties. At present, the only recourse the foundryman has is to select a charge of low-sulphur scrap or to employ a melting practice in which sulphur can be controlled.

It becomes increasingly obvious that sulphur is one of the most critical factors affecting the quality of cast steel. It is unfortunate that in acid electric practice, which is so widely used in the steel foundry industry, a practical means of sulphur removal has not been developed. Some control is achieved by ladle additions of aluminum, calcium and selenium, but control with these additions is most effective when sulphur contents are low. The excellent results secured with magnesium additions to cast iron hold some promise for ladle additions of magnesium alloys for reducing the sulphur content of steel. Despite encouraging experimental results in some instances, the high tempera- (*Please turn to page* 207)

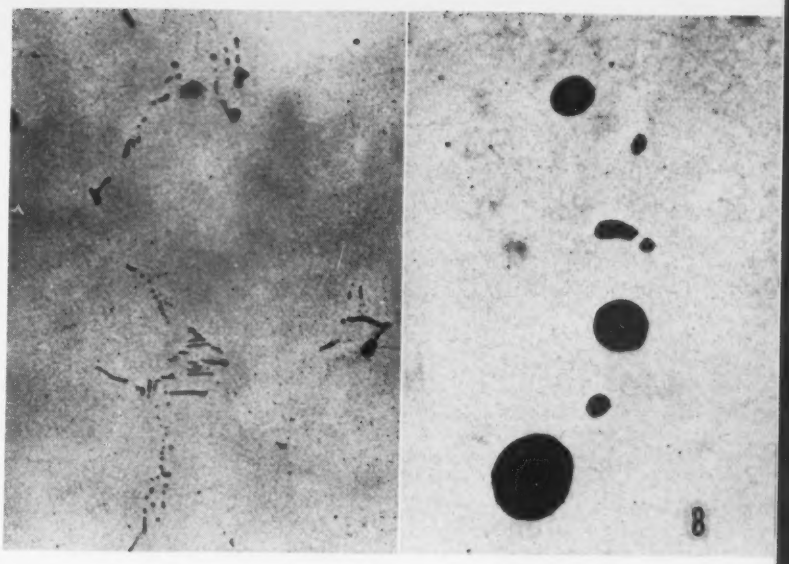


Fig. 8—Showing the effect of selenium addition sulphides in cast steel (Gagnebin)

TABLE I—Effect of Calcium Selenium on Ductility of Various Cast Steels Finished with .02% Aluminum (Gagnebin)

Composition	Melt Treatment	Yield Point, psi	Tensile Strength, psi	Elongation %	Red. in Area %	Charpy Ft Lb
	CARBON STEEL					
(.30 C, .75 Mn, .35 Si)	.01 Al	49,900	72,800	21.5	29.2	21
	.02 Al, .05 Ca, .03 Se	49,500	73,600	30.0	50.0	42
	NICKEL MANGANESE					
(.30 C, 1.5 Ni, 1.5 Mn, .35 Si)	.02 Al	66,000	93,100	28.5	28.5	19
	.02 Al, .05 Ca, .03 Se	67,600	93,000	27.5	50.0	38
	NICKEL MOLYBDENUM					
(.28 C, 1.75 Ni, .25 Mo, .75 Mn, .35 Si)	.02 Al	68,500	88,000	18.5	26.8	21
	.02 Al, .05 Ca, .03 Se	62,500	87,500	26.5	52.5	39
	NICKEL CHROMIUM					
(.35 C, 1.5 Ni, .75 Cr, .75 Mn, .35 Si)	.02 Al	73,700	103,000	14.5	21.7	16
	.02 Al, .05 Ca, .03 Se	71,800	100,100	23.0	48.5	36
	NICKEL VANADIUM					
(.30 C, 1.5 Ni, .1 V, .75 Mn, .35 Si)	.02 Al	73,700	88,200	17.5	24.1	16
	.02 Al, .05 Ca, .03 Se	70,300	86,800	29.0	53.9	48½
	NICKEL SILICON					
(.22 C, 1.5 Ni, 1.2 Si, .90 Mn)	.02 Al	67,200	88,100	25.0	36.4	
	.02 Al, .05 Ca, .03 Se	64,900	88,800	28.0	51.4	
	MANGANESE TITANIUM					
(.30 C, 1.6 Mn, .35 Si, .1 Ti)	None	67,800	94,100	19.0	32.5	
	.05 Ca, .03 Se	66,400	93,200	22.0	36.9	

Heat Treatment—Normalized and Tempered 1200° F

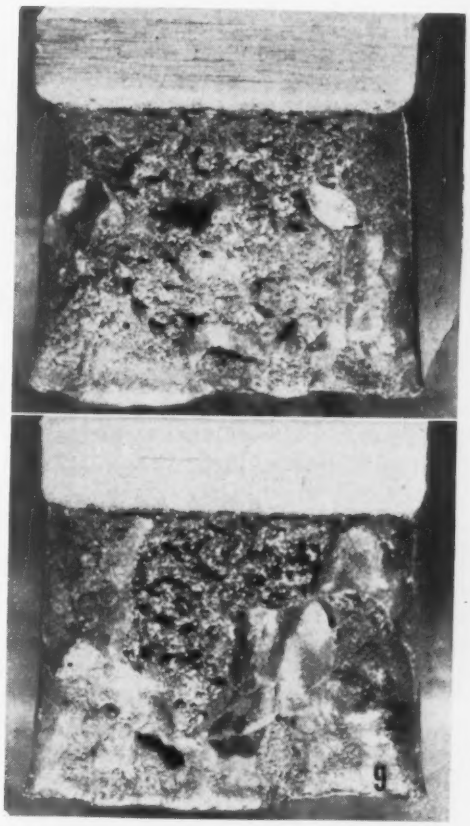


Fig. 9—Typical, conchoidal fractures in cast steel

TABLE II—Effect of Time Interval Between Aluminum Addition and Pouring on Ductility of Nickel-Manganese Cast Steel

C %	Ni %	Mn %	Si %	S %
0.30	1.50	1.50	0.40	0.035

Melt Treatment	Normalized and Tempered Yield Point, psi	Tensile Strength, psi	Elongation %	Reduction of Area %
Properly oxidized .06% Al	63,500	93,000	27.0	54.0
Poured immediately .06% Al	70,500	97,000	25.0	45.4
Poured immediately .06% Al	67,700	93,000	26.0	45.7
Held 2 minutes .06% Al	67,700	93,200	21.0	36.0
Held 4-5 minutes	70,700	98,700	21.5	33.1

TABLE III—Tensile and Impact Properties of Ni-Cr-Mo Cast Steel Heat Treated To 300 Brinell

(1800° F Normalize—1550° F Oil Quench)

Mark	C	Mn	Ni	Cr	Mo	Tempering Temp. ° F.	Yield Point	Tensile Strength	% Elongation	Red. in Area, %	Charpy (Keyhole) Ft. Lbs.
A	.20	1.0	1.7	1.0	.38	1010	135,000	144,000	18.0	59.4	50
B	.28	1.0	1.7	1.0	.37	1075	133,200	148,500	17.0	50.6	49½
C	.34	1.0	1.7	1.0	.38	1120	137,000	147,000	14.5	39.7	30
D	.36	1.0	1.7	1.0	.38	1125	135,750	153,000	16.0	41.6	41

A Boy Scout troop committee meets in a company office

Community Relations

—MANAGEMENT'S RESPONSIBILITY

THERE no longer seems to be any doubt that good community relations mean good business. This fact holds true in the foundry industry just as it holds true in industry at large.

Industry has a responsibility to the community to provide steady employment as well as good products. But in addition to this one responsibility, there is another which is just as important—that is to provide leadership, in the community, in general fields.

Many community-wide activities suffer because of a lack of available, experienced leadership; herein lies a fertile field for building up goodwill and performing effective services which will result in establishing industry as civic-minded and progressive. When company executives work with the townspeople for a common goal, the result is improved community relations.

Active participation in civic affairs also means that company representatives become well known in the community, and they, in turn, get to know the people in the community. This kind of contact is one of the biggest factors in good community relations.

Generally, it is felt that since most foundries usually do not sell their products directly to consumers, public relations or community relations are not important functions. However, the fact remains that foundries, too, must be concerned about public acceptance of their plants and the disadvantages of having such plants near or adjacent to residential areas.

Foundries also depend on the general public for workers, and community-relations activities can often be the determining factor in attracting desirable applicants for job openings.

All industrial plants must depend on the community for certain necessary services which are vital to continuing operations. This being true, it appears

Company employees' children visit Santa Claus at a local store

that the foundry industry must review its policies as they regard the community, to make sure that the proper emphasis is placed on their responsibilities to the community and that those responsibilities are discharged in a manner befitting a good citizen and neighbor.

Objective—Those directly concerned with community relations should have as their objectives, the following:

Developing and maintaining the community's good will and respect.

Emphasizing that active participation in civic affairs is an important function of management.

Telling the story of industry, its functions, and its problems to the public—to better emphasize the importance of the free enterprise system to our way of life.

Knowing the community and its needs and contributing to the solution of community problems.

In other words, industry must be a good citizen by supporting community projects and providing leadership and cooperation whereever advisable.

Organization—Since most foundries cannot be classified as "big industry," it might not be feasible to designate one person as being "in charge of" community relations. Therefore, the head of the organization should make the policy and lead the way in the over-all program.

For example, the president or the general manager, as the case may be, may provide the leadership for such community organizations as the Community Chest and the YMCA Board of Trustees. Or he may head up local fund-raising campaigns of benefit to the community as a whole.

Other executives on the top-management level may serve on the boards of community-welfare agencies. They can also be active in, and offer leadership to, such groups as foremen's clubs, personnel associations, industrial recreation associations, churches, and any other civic organizations which need and use volunteer services.

In small foundries where community-relations activities are not centralized, some responsibilities may be channeled to those divisions and departments best suited for certain activities. Specifically, personnel department workers can provide advisory assistance to schools and professional groups. Foremen may serve as counselors or they may provide technical assistance to educational organizations. In many cases members of personnel departments *and* foremen serve as instructors for adult education classes.

To complete the picture, production workers have been known to serve as scoutmasters or members of Boy Scout troop committees. It is good to encourage all, who have something to offer, to participate in community relations ac- (*Please turn to page* 246)

By ANDREW G. FREEMAN
Public Relations Counsel
G. H. R. Foundry Division
Dayton Malleable Iron Co., Dayton, O.

QUESTIONS and A

Gray Iron Castings for Shoes

Q.—Where can we get information concerning cast iron suitable for magnetic yokes and pole shoes for use in dc motors. One of our customers has been buying these castings from a steel foundry, but this source of supply is not available at present. Analysis of the steel castings shows Si from 2.25 to 2.50 per cent, and less than 1.00 per cent C. Can we melt a small quantity of iron, say about 200 lb, and maintain the proper analysis in an oil-fired crucible furnace? Is a special type crucible required?

A.—A soft gray iron, C 3.25 to 3.50 per cent and Si between 2.50 and 3.00 per cent, depending on the metal section, will serve fairly satisfactorily in magnetic yokes and pole shoes in dc motors. In magnetic permeability the cast iron is almost equal to steel, but of course in general strength, it is far below. For equivalent strength, the gray iron casting has to be between two and three times as thick as a steel casting. In many instances the high strength is not a necessary factor and a compromise may be made with the customer or designer. However, it is practically certain that patterns designed for steel castings will not serve for iron castings.

Since you have a cupola in your shop there is no need to consider the use of a crucible, unless you contemplate melting steel of the rather unusual composition mentioned in your inquiry—2.50 per cent Si and under 1.00 per cent C. The carbon content is normal, but we are wondering if the decimal point was misplaced in the silicon. Should it not be 0.25? The temperature in an ordinary oil-fired crucible furnace, presumably designed to melt nonferrous metal, is not high enough to melt steel. One of the most careful and thorough researches on the magnetic and electrical properties of cast iron is that by H. J. Partridge, *Carnegie Scholarship Memoirs,* 1928, published by the Iron & Steel Institute, London. Possibly your public library may have a copy.

Wants Test for Coke Breakage

Q.—We would like any information available on shatter tests for coke, including a detailed method of procedure for making the tests, if possible.

A.—Complete details of the procedure in determining breakage of coke in handling is described in ASTM standard specification D 141-48 "Drop Shatter Test for Coke" which may be obtained from American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., for 25 cents.

Briefly, the method consists in placing a 50-lb sample in a box 18 x 28 x 15 in. with a hinged bottom. Box is mounted 6 ft above a rigid steel or cast iron plate. Coke is dropped on the plate four times and is returned to the box after each of first three drops. Material then is screened on a series of four square-mesh sieves ranging from 2 to ½-in. in ½-in. increments. Retained material on screens is tabulated as the indicator.

Handling of High-Lead Alloys

Q.—Will you please supply us with any information or instructions you may have regarding the casting and mixing of the following metal: Material NWB-40; photomicrostructure showing open dendritic structure with lead evenly dispersed; brinell hardness 22 (500-kg load, 10 mm ball); tensile 7600 psi; composition—Cu 57.5 per cent, Pb 38.0 per cent, Ni 2.73 per cent, Sn 1.23 per cent, Te 0.61 per cent.

A.—Evidently your reference to mixing indicates use of the various metals in ingot form for preparation of the final alloy, and since the copper and nickel have the highest melting points, they should be placed in the crucible together and melted. The tin, lead and tellurium have low melting points, and are added when the copper is in a fluid state—preferably just a short time before pouring. However, since 38 per cent Pb is to be added, that amount will tend to lower the temperature, and the time of addition should be far enough in advance of pouring to permit attaining the proper temperature.

As in the case of other copper-base alloys, the furnace atmosphere should be slightly on the oxidizing side to hold pick-up of deleterious gases to the minimum. Pouring temperature range of the high-lead alloys is given as 1850 to 2050°F, and should be as low as possible in relation to section size so that the lead will be dispersed in the fine, globular state. When the alloy is poured too hot, the time for solidification is extended, and the lead tends to segregate. High pouring temperatures also result in lead sweat. As a further aid to obtain uniform distribution of the lead, the alloy should be stirred well just before pouring—using a pumping action with the stirrer to create a rolling action from top to bottom of the crucible bath.

High-lead alloys are subject to bleeding and lead segregation, due essentially to gas absorption, high pouring temperature as previously indicated, and removing the castings from the mold too soon. Trouble from gas absorption is due primarily to hydrogen, and the alloys should be melted rapidly and not allowed to remain in the furnace any longer than necessary. Some recommend the addition of copper oxide (not more than 0.10 per cent) followed by deoxidation with phosphor-copper or phosphor-tin. The British suggest placing a small amount of manganese dioxide or marble chips at the bottom of the crucible

Answers

prior to putting in the charge for melting. These materials create a steady stream of gas in the form of fine bubbles which carry off any hydrogen or prevent its entry.

These alloys tend to penetrate the interstices between the sand grains, hence it is almost mandatory that the mold and core faces be coated with red talc or plumbago (graphite) to eliminate trouble from that source. Some recommend the use of strainer cores at the junction of sprue and runner. If possible, the gating should be through a riser, either open or blind, to secure good feeding.

To Resist Rust and Corrosion

Q.—We make underground lawn sprinkler systems and are considering use of cast iron fittings, due to the shortage of nonferrous materials. Since the parts will be buried in the ground, can you advise us what kind of a coating should be applied to the fittings to make them resistant to rust and corrosion?

A.—Satisfactory results should be obtained if you would purchase the galvanized type rather than the black. If the former cannot be obtained, other protective coatings could be applied. One method would be to dip the fittings in either hot or cold tar or bituminous materials such as are employed to coat cast iron soil and water pipe. Or you might dip coat with a suitable synthetic resin such as phenolic, alkyd or vinyl type. A short time ago the Gray Iron Founders' Society, 210 National City-East 6th Bldg., Cleveland 14, published a booklet entitled "Metallic and Nonmetallic Coatings for Gray Iron" which describes various methods for protecting and decorating gray iron castings, and we suggest that you obtain a copy of it for reference.

Steel Scrap is Hard To Break

Q.—We have several tons of miscellaneous steel scrap accumulated over a period of years, because it was too large to charge into our cupola lined to 20 in. diam. In Mexico we are in a difficult position at present with scarcity of scrap of all kinds, and with apparent scarcity of suitable equipment for reducing large scrap to cupola charging size. An inquiry for an alligator shear brought no response. The cost of a torch and the high price of acetylene in this country prohibits the use of this device. In some plants we have seen a circular saw cutting beams and rails, but we never have seen a circular saw employed in cutting scrap. What is your opinion on this subject? Most of our metal is poured into balls and liners for ore grinding mills.

A.—We regret that we cannot offer any satisfactory answer to your present problem. In addition to the extreme difficulty of getting any suitable equipment, you are faced with the first high cost, and the subsequent maintenance cost while any equipment is in operation. Unless machinery or equipment of almost any kind is kept in constant or nearly constant operation, the running cost, obsolescence, and depreciation impose an impossible burden. All the pieces of equipment you mention—shear, torch and saw—are employed extensively for cutting metal, old and new, but they need gas or electric current. Steel rails may be broken by cutting the flange on both sides into the web. A smart blow from a sledge hammer then will break the rail.

Cupola Melting Loss Variable

Q.—The Foundry Data Sheet in regard to cupola mixture which appeared in the August 1951 issue of FOUNDRY is highly interesting. We are, however, curious to have information on one point in this connection. Could you let us know what is your average standard melting loss "unrecoverable" in respect to metals?

A.—For the average standard melting loss "unrecoverable" in cupolas, we offer the following references:

On page 263 of the *Handbook of Cupola Operations,* published by the American Foundrymen's Society, a conversion factor of 5 per cent is indicated with a presumable 50-50 pig and scrap mixture—although that is not stated—and where scrap is in excess of two-thirds of the charge, especially if an appreciable amount of that is light material, it is better to allow 6 per cent.

A. W. Gregg in a paper, "Ferrous Melting Furnaces

GANGWAY!

By J. A. PATTERSON

"Gosh, I feel great today—This bag of shot abrasive is as light as a feather!"

QUESTIONS *and Answers*

in the United States and Canada," *Transactions,* AFS, 1950, states that cupola melting loss is extremely variable and depends on character and cleanliness of the charge. With clean scrap and good operating conditions, the melting loss may be as low as 2 per cent. With oxidized, dirty or light-section scrap, melting loss may be as high as 10 per cent. With a large percentage of steel scrap in the charge, the melting loss will be about 6 per cent.

However, Lannigan in an article in the January, 1936 issue of FOUNDRY (page 34) gives some figures obtained by careful checking by a large corporation on 20-ton heats in a 48-in. ID cupola over a period of 6 months. Some of the loss figures follow:

All pig—0.003 per cent; No. 1 machinery scrap—0.65 per cent; light machinery scrap—0.98 per cent; car wheels—0.68 per cent; clean stoveplate—2.75 per cent; old stoveplate—5.85 per cent; 50 per cent pig —50 per cent car wheel borings without binder—1.23 per cent; briquets alone—2.01 per cent; high carbon and mild steel scrap—gain of 1.65 per cent.

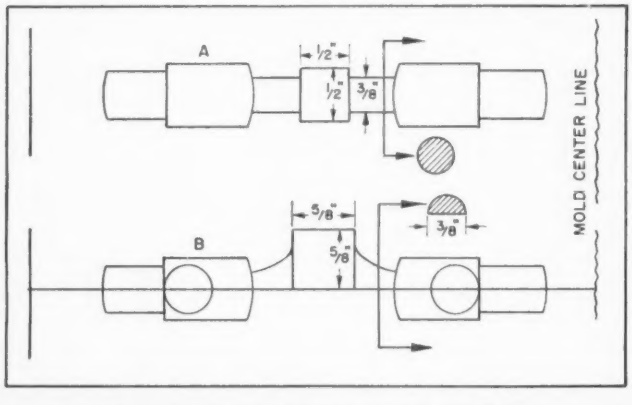
Runner Freezes Before Casting

Q.—We are sending you two sample red brass castings on which we would like to have your advice on how to eliminate the small holes appearing at the point where the gate enters. Castings are gated 32 in a 12 x 16-in. flask from two runners about ½-in. square using No. 00 sand on an air squeezer. Drag is 2 in. deep using a ¾-in. sand frame and squeezed at 80 psi. Cope is 2¾ in. deep and squeezed at 40 psi. Sprue is 1¼ in. in diam, and molds are poured flat on a conveyor. Metal is as cold as we possibly can pour it at about 1800°F.

A.—While you mention that you are pouring the red brass castings at 1800°F, we suspect that the pyrometer is not correct or that the procedure for temperature determination is not being done properly. The temperature mentioned is not much above the melting range, and would cause considerable trouble from misruns. Pouring temperature usually employed is in the range of 1950 to 2250°F, and for these small castings we would suggest about 2100°.

Evidently, while not so stated, the pouring temperature has been decreased from a higher one with the hope of overcoming the shrink holes occurring at the junction of gate and casting. However, the trouble is due to lack of feed from runner to casting—the gate and runner freezing before the casting. From your description we gather that the method of gating is as shown in sketch *A* in the accompanying illustration, and a comparison of the volume-area relationships of casting and runner, while not an exact method, leads to the opinion that the runner has a slightly higher cooling rate than the casting. Since the runner and gate should cool slower than the casting to provide feeding, the runner should be made so that the V/A value is greater than that of the casting, and the gate designed to remain open until the casting freezes.

Possibly this may be accomplished by increasing the size of your present runner to ⅝-in. square, but we believe that better results will be obtained by arranging the gating system as shown in sketch *B* in the illustration.



Suggested method for gating castings

Castings Show Chilled Edges

Q.—We are making a gray iron casting 3-in. square and ⅞-in. thick with a 1⅜-in. hole in the center. The analysis of the iron in these castings is: TC—3.10 to 3.35, Si—1.50 to 1.85, S—0.06 to 0.10, P—0.15 to 0.20, Mn—0.75 to 0.90, Cr—0.25 to 0.35, and Ni—0.50 to 0.75. These castings are machined all over and then heat treated by the customer. The heat treat procedure is: Heat to 1575°F, hold for 12 to 15 minutes, quench in oil, draw 1 hr at 300°F, then room temperature. After heat treat, castings should brinell from 477 to 512. Some of these rings will have a chilled edge and cannot be machined. We have annealed these rings at 1650°F for 1 hr but the customer will not accept them. They say that they cannot heat treat them to proper hardness after we have annealed them. Is this due to improper annealing or should the method of heat treatment be changed after they have been annealed? Do you think we should try to anneal these rings and heat treat them? If so, please give detailed recommendations.

A.—Tendency to seek palliatives instead of curing by eliminating the source of the trouble is a common failing from which none of us is free. Hence, it is advisable to eliminate hard edges so that there will be no need for annealing. That will cut out an extra operation which adds to the production cost of the casting.

Evidently the difficulty with chilled edges is only encountered with these particular castings, and for good and sufficient reasons it is not desirable to make changes in composition which possibly might affect other castings produced. Therefore, any adjustments will have to be made by ladle additions, and we are sure that the trouble from chilled edges can be overcome through use of some type of graphitizing agent such as coarse graphite, ferrosilicon or proprietary graphitizing agents. In that connection,

(*Concluded on page* 124)

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QUESTIONS *and Answers*

(*Concluded from page* 122)

it will be advisable to employ wedge bars for control purposes, the depth of chill from the point being tied in with the occurrence of chilled edges in the casting. With such a control test just the proper amount of graphitizing agent could be added to accomplish the desired results, or ladles of iron could be accepted or rejected on the basis of chill for pouring into these particular castings.

Of course, some little time will be required to obtain sufficient data for suitable control, and while that is in progress, you have your problem of satisfying the customer on present castings. Two solutions to the problem are available, the most obvious being to persuade the customer to increase the holding or soaking temperature at 1575°F to assure maximum transformation of carbon into the combined state. Usual recommendation for heat treatment is to hold at temperature for at least 1 hr per inch of thickness, and the present practice is far from meeting that. Experimentally you could try some of the castings in the as-cast and annealed condition to determine the minimum holding time of 1575°F before approaching the customer.

The other solution would be for you to determine experimentally the lowest possible annealing temperature which would permit satisfactory machining of chilled edge castings. For example, you might try annealing the castings at 1400°F to see what effect is obtained in relation to the chilled edges, and then increase or decrease the temperature by about 25° variations as the case may warrant—until the desired results are obtained. Then, of course, you would have to try the annealed samples in the heat treating cycle to see whether the hardness is within the desired range.

Use More Limestone in Cupola

Q.—Can you suggest the cause and point out a remedy for the following trouble we are having with our cupola lined to 24 in. diam and supplied with air from a blast pipe 8 in. diam and three tuyeres each 5 in. diam. After the second or third charge we add 6 or 8 lb limestone to each charge for a flux. It does not seem to work since a bridge forms across the cupola by the time about 2 tons of iron has been melted. What is the correct charge of iron, coke and limestone for a 24-in. cupola? Do you think our trouble is due to insufficient air or flux or both?

A.—Offhand we should say that the cupola bridge is caused by lack of limestone. Without further details it is impossible to specify the direct cause of your trouble. Instead we shall indicate some of the essential features for the proper operation of a small cupola. You can check your present practice against this outline and thus be in position to make any necessary changes in composition of the charge.

A 24-in. cupola has a melting capacity of 4500 lb of iron per hour. Since approximately 30,000 cubic ft of air is required to melt 1 ton of iron, it follows that the blower will have to supply 67,000 cubic ft of air per hour or 1116 cubic ft per minute. To compensate for leaks and losses, the blower should be capable of delivering 1500 cfm at a pressure of 6 to 8 oz. A 10-in. pipe will be required to connect the blower with the cupola. A wind belt should deliver air to a continuous tuyere through the lining 3 to 4 in. high so that the air can enter the body of fuel all around freely and in sufficient volume or you could use five tuyeres of your present size. A prolific source of trouble in small cupolas is the attempt on the part of the melter to use large metal charges. In a 24-in. cupola the iron charge should not exceed 500 lb. If the coke is of an inferior quality the charge should not go over 300 lb. You might start with 300 lb iron, 40 lb coke and 10 lb limestone. The amount could be modified after one or two trials. For short heats it is not necessary to open the slag hole.

Making an Alloy for Bearings

Q.—We make up small lots of bearings in the 80-10-10 alloy from time to time, but on our last order our supplier of ingot could not ship that analysis, but sent 85-5-5-5 ingot. Can we make a fairly good bearing from that composition? We have as possible additions a good grade of lead, some genuine babbitt, and some scrap worm gear wheels as used in truck axles. Would any of those be helpful?

A.—The 85-5-5-5 alloy is not a bearing alloy, hence it could not be used for the purpose you have in mind. Moreover, no amount of juggling with the 85-5-5-5 alloy will permit reaching the desired 80-10-10 composition. You mention that you have some genuine babbitt on hand, but without definite information as to composition, you would have trouble employing it in a brass or bronze to upgrade the tin content. There are numerous analyses for babbitt, so you must know the composition to use it intelligently. One difficulty in its application for bronze is the antimony content, which might lead to a dendritic structure in the bronze, reduction of resistance to impact, and brittleness.

Consequently, you hardly could use the babbitt with copper and lead to make the 80-10-10 alloy, even assuming that the babbitt contained 89 per cent Sn, 3.5 per cent Cu, and 7.5 per cent Sb, since 10.5 lb would have to be used to provide slightly over the lower limit of 9 per cent Sn in the 80-10-10 alloy. This would result in 0.78 per cent antimony, which is considerably over the suggested 0.25 per cent. Possibly you might try making what is termed by some a "general utility" bearing alloy. It contains a minimum of 82 per cent Cu, 6.5 to 7.5 per cent Sn, 6.5 to 7.5 per cent Pb, and 2.5 to 4.0 per cent Zn. It could be made using 91 lb of the 85-5-5-5 alloy, 4.75 lb copper, 2 lb lead, and 2¼ lb babbitt. Resultant composition would show about 82 per cent Cu, 6.50 per cent Sn, 6.50 per cent Pb, 4.50 per cent Zn, and 0.17 Sb, and would be somewhat high in zinc and somewhat low in tin and lead. This alloy, usually termed the 83-7-7-3 alloy, can be employed for bearings which operate under moderate pressures and speeds.

WHEREVER THE HOT STUFF HITS

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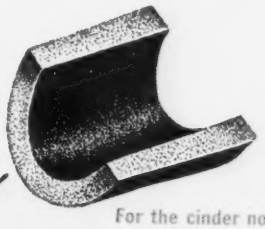
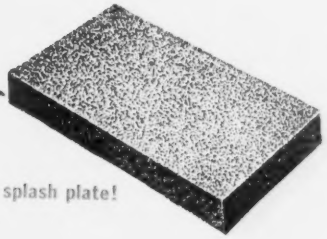


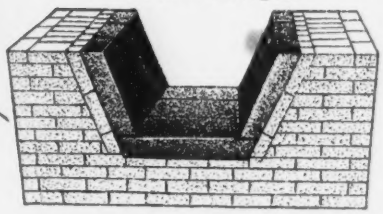
For the cinder notch liner!

For the cinder notch plug!

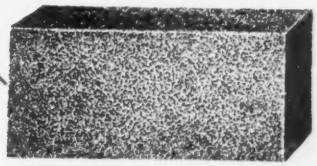


For the splash plate!

For the runout troughs!



For the skimmer plate!



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MEN

of Industry

WILLIAM M. BLACK has been appointed president, Electro - Alloys Division, American Brake Shoe Co., New York, succeeding **Walter G. Hoffman,** who has been named assistant to the vice president for Research and Development at Mahwah, N. J. **Joseph L. Mullin** has been made vice president of Electro-Alloys Division. Mr. Black, who joined the company as an apprentice in 1912, has been a vice president of American Brake Shoe Co. since 1942 and president of American Manganese Steel Division since 1940. Mr. Hoffman started with the sales department of American Manganese Steel Division in 1930 and became president of Electro-Alloys Division in 1943. Mr. Mullin, who joined the American Manganese Steel Division in 1914, will continue as vice president in charge of operations for that division.

♦ ♦ ♦

Don Smith, for the last year general production manager, Wellman Bronze & Aluminum Co., Cleveland, has been appointed vice president in charge of production. Mr. Smith served his apprenticeship at the Forth & Clyde Steel Works, Scotland, and came to the United States in 1928. He worked at various plants until 1934 when he became a molder for Aluminum Co. of America. In 1939 he was made shift foreman at its Magnesium Division, Cleveland, and in 1941 was transferred to Bridgeport, Conn., as general foundry foreman, later becoming assistant superintendent. He was appointed superintendent of the Peerless Plant of Wellman Bronze & Aluminum Co. in 1943 and plant manager the following year.

♦ ♦ ♦

Roy N. Hoffman has been elected president, Michigan Malleable Iron Co., Detroit. Mr. Hoffman has been associated with the company for 36 years. **James T. Worton,** with the company 28 years, has been named vice president.

♦ ♦ ♦

Edwin J. Lally Jr. was recently appointed superintendent, Dostal Foundry & Machine Co., Pontiac, Mich. Following graduation from Case Institute of Technology in 1939, Mr. Lally spent a year with Fanner Mfg. Co., Cleveland, as chemist and metallurgist and 4 years in a similar capacity with Taylor & Boggis Foundry Co., Euclid, O. For the last 6½ years he has been associated with Forest City Foundries Co., Cleveland, as melter and metallurgist.

♦ ♦ ♦

N. E. Martin was recently appointed assistant foundry superintendent, J. I. Case Co., Bettendorf, Iowa. Mr. Martin served his apprenticeship at Caterpillar Tractor Co., Peoria, Ill., where he remained for 10 years. During the war he was assigned to the foundry of a ship repair base in Palermo, Sicily, and following military service spent a year at Donovan Inc., St. Paul, and two years as a unit foreman at J. I. Case Co. More recently he has been foundry superintendent, Stedman's Foundry & Machine Works, Aurora, Ind.

♦ ♦ ♦

Chester A. Henry has been appointed assistant manager of the magnesium foundry, Ford Aircraft Engine Division, Ford Motor Co., Chicago. Until recently Mr. Henry was owner of the Interstate Precision Pattern & Engineering Co., Chicago.

♦ ♦ ♦

Oral E. Bond, president, the Bond Foundry Corp., Decatur, Ill., has sold part of his interest in the company and has taken an indefinite leave of absence. Mr. Bond acquired the foundry in 1947. Prior to that he was general manager, the Model Brass Co.,

(*Continued on page* 128)

WILLIAM M. BLACK
. . . *Electro-Alloys head*

WALTER G. HOFFMAN
. . . *Brake Shoe research*

JOSEPH L. MULLIN
. . . *v.p., Electro-Alloys*

DON SMITH
. . . *v.p., Wellman Bronze*

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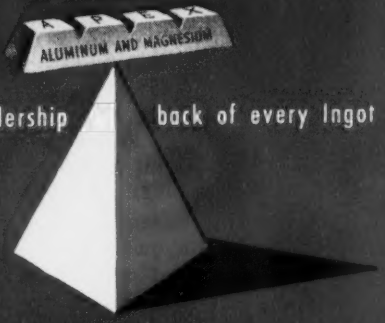

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RICHARD A. FLINN JR.
. . . joins university staff

ADGER S. JOHNSON
. . . pres., National Carbon

JAMES R. COFFING
. . . Coffing Hoist sales

JULIUS H. NILL
. . . Metallizing manager

(*Continued from page* 126)

Decatur, for 11 years. **J. L. Stewart,** vice president of the Bond Foundry Corp., will be in charge of the company.

♦ ♦ ♦

Richard A. Flinn Jr., who is joining the University of Michigan as associate professor of product engineering and metallurgical engineering, as reported in October FOUNDRY, has been associated with American Brake Shoe Co., Mahwah, N. J., since 1941, and will continue in a consulting capacity. Recently he has been assistant chief metallurgist of the company's Research and Development Center. Graduated from College of the City of New York in 1936, Mr. Flinn also received a degree in metallurgy at Massachusetts Institute of Technology, where he later served as a staff member. From 1937 to 1939 he was metallurgist, International Nickel Co., New York. Mr. Flinn was the 1947 Peter L. Simpson medalist of the American Foundrymen's Society.

♦ ♦ ♦

Adger S. Johnson has been appointed president, National Carbon Co., division of Union Carbide & Carbon Corp., New York. Mr. Johnson joined the company in 1928, following graduation from Virginia Polytechnic Institute. In 1944 Mr. Johnson became assistant to the vice president in charge of production, four years later vice president in charge of foreign plants and for the last year has been vice president-general manager of the company.

♦ ♦ ♦

James R. Coffing has been elected vice president in charge of sales, advertising and general office administration, Coffing Hoist Co., Danville, Ill. Mr. Coffing, who attended University of Alabama, was first associated with the company at an early age as a clean-up boy. He worked in various departments of production and administration until be became general sales manager prior to World War II, and has held that position since his return from military service.

♦ ♦ ♦

Julius H. Nill has been appointed southern regional manager, Metallizing Engineering Co., Long Island City, N. Y., with headquarters in New Orleans. Mr. Nill, formerly field engineer in the Middle and Southern Atlantic states, joined the company in 1945.

♦ ♦ ♦

Albert E. Edwards, recently elected chairman of Saginaw Valley Chapter of the American Foundrymen's Society

ALBERT E. EDWARDS

for 1951-52, is production superintendent, Chevrolet Gray Iron Foundry, Saginaw, Mich., Division of General Motors Corp., Detroit. Mr. Edwards came to the United States from England in 1923 and worked as a molder until 1928, when he became shop foreman, Nichols & Shepard Co., Battle Creek, Mich. He joined Chevrolet Gray Iron Foundry as a foreman in 1929. He was a director of Saginaw Valley Chapter for 3 years and served as vice chairman last year.

♦ ♦ ♦

John A. Shaw has been named assistant manager of development, International Graphite & Electrode Corp., Niagara Falls, N. Y., subsidiary of Speer Carbon Co., St. Mary's Pa. He will direct experimental work in development of new and improved electrodes, anodes and related carbon and graphite products. **Frederick A. Stephens** has been appointed development engineer in charge of the powdered metallurgical section of the technical department of the company in Niagara Falls. **Herbert A. Ridgway** has been transferred to International Graphite & Electrode Corp. from the parent company as a development engineer.

♦ ♦ ♦

Robert C. Anderson has been appointed sales engineer, Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich. Mr. Anderson was graduated from Drexel Institute of Technology and took post-graduate work at University of Minnesota. For the last 21 months he was sales representative for the Joseph Dixon Crucible Co. in Buffalo.

♦ ♦ ♦

Raymond E. Teach has been appointed core oil sales representative in New Jersey, eastern Pennsylvania and Maryland for Werner G. Smith Inc., Cleveland. Mr. Teach, whose headquarters will be in Haverford, Pa., was formerly engaged in sale of core oils for Swan-Finch Oil Corp., Hackensack, N. J.

♦ ♦ ♦

M. K. Griggs and **Burton W. Wallin** of the M. K. Griggs Co., Houston, Tex., have been appointed representatives in the Houston region for Euclipse Fuel Engineering Co., Rock-

(*Continued on page* 131)

Charley the Core-Maker Says:

SPEED PRODUCTION WITH KRAUSE CEREAL BINDERS

Mix Quicker — Mold Faster
Collapse and shake out in a jiffy

MORE GREEN STRENGTH:

In both green and dry core stages there is greater binding strength with Truscor and Amerikor — they supply the needed green bond and strong affinity between sand granules.

FINER DETAIL:

Smooth surfaces — sharp, unbroken edges — less scabbing, cold shut, buckling — because Truscor and Amerikor are scientifically processed to provide these advantages.

FINE FLOWABILITY AND TEXTURE:

The uniform quality of Truscor and Amerikor insures quicker mix — easier blending — less sticking — uniform ramming — increased permeability.

EASY, BURN-OUT COLLAPSIBILITY:

Because cereal binder burns out rapidly and completely during casting, you are sure of ready collapsibility and easy shake out when you use Truscor or Amerikor.

For better, lower-cost cores, place a trial order for Krause Cereal Binders now — Truscor, if you like a light weight binder; Amerikor, if you prefer a heavier weight. Call any one of the distributors listed below or write us direct. **CHAS. A. KRAUSE MILLING CO., Milwaukee 1, Wisconsin.**

World's Largest Millers of Dry Corn

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A. L. Cavedo & Son, Inc.
Richmond 21, Va.

Foundry Supplies Co.
Chicago 16, Ill.

J. H. Hatten
Lansdowne, Pa.

Schuler Equipment Co.
Birmingham, Alabama

Independent Foundry Supply Co., Los Angeles 11, Calif.

Marthens & Co.
Moline, Illinois

Carl F. Miller & Co.
Seattle 4, Wash.

Milwaukee Chaplet & Mfg. Co., Milwaukee 15, Wis.

Porter Warner Industries, Inc.
Chattanooga 2, Tenn.

Smith-Sharpe Co.
Minneapolis 14, Minn.

Snow & Galgiani
533-543 Second Street
San Francisco 7, California

Frederic B. Stevens, Inc.
Buffalo 12, N. Y.

Frederic B. Stevens, Inc.
Cleveland 14, Ohio

Frederic B. Stevens, Inc.
Detroit 26, Mich.

Frederic B. Stevens, Inc.
166 Brewery Street
New Haven 11, Connecticut

THE BIG "3"

Capable of rough cutting plus blending of welds.

Only really flexible grinding wheel ever offered.

Withstands extremely rough usage —extra safe.

BAYFLEX — DURACUT — SAF-T-CUT, reinforced abrasive disc-wheels . . . the masters of your weld grinding and finishing problems. Greater resiliency and safety make these "Big Three" products first choice in foundries, metal fabricating and welding shops.

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Brantford, Ontario

Send for latest information-packed "BIG-THREE" catalog. It contains such data as mounting instructions, recommended speeds, charts, specific applications, etc.

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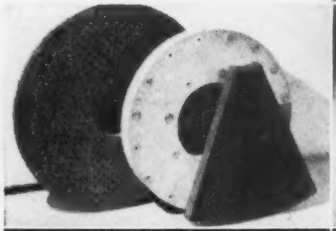
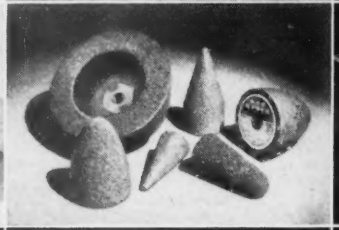
CUT-OFF WHEELS

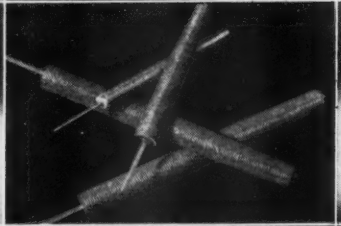
SNAGGING WHEELS



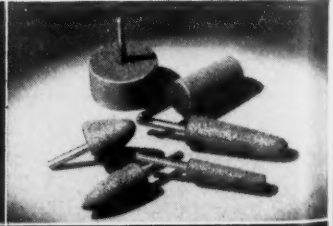
INSERTED NUT and PLATE MOUNTED DISCS



CUP WHEELS • CONES



CORE FILES



MOUNTED POINTS

BAY STATE OFFERS A RUGGED LINE FOR STEPPED-UP PRODUCTION

(*Continued from page* 128)

ford, Ill., maker of industrial gas and oil-burning equipment. Both men have had extensive experience in the heating and engineering fields.

♦ ♦ ♦

H. Oliver Pels was recently appointed foundry superintendent, Eberhard Mfg. Co., Cleveland, division of Eastern Malleable Iron Co., Naugatuck, Conn. Mr. Pels was previously associated with Benton Harbor Malleable Industries Inc., Benton Harbor, Mich., and Central Foundry Division, General Motors Corp., as foundry superintendent.

♦ ♦ ♦

R. B. Kropf, metallurgist, who has been in charge of the Cincinnati technical section, International Nickel Co., New York, has been transferred to the Detroit technical section, and **C. T. Haller,** formerly in the Pittsburgh technical section, has been placed in charge of the Cincinnati technical section. Mr. Kropf was graduated from Michigan College of Mining and Technology and University of Wisconsin. He was formerly associated with Copperweld Steel Co., Hartford, Conn., and Republic Steel Corp., South Chicago, Ill. Mr. Haller, a graduate of Carnegie Institute of Technology, was previously with Carnegie Illinois Steel Corp., Pittsburgh, and Latrobe Electric Steel Co., Latrobe, Pa.

♦ ♦ ♦

Robert P. Schauss has joined Werner G. Smith Inc., Cleveland, as sales manager of its Chicago office, 400 West Madison St., to cover the Chicago area, Indiana and Wisconsin. Mr. Schauss, graduated from Case Institute of Technology in 1938, was with the Cicero, Ill., plant of National Malleable & Steel Casting Co., as chief metallurgist, later becoming superintendent of its malleable foundry there. More recently he has been foundry engineer, Illinois Clay Products Co., Chicago. Mr. Schauss is a director of the Chicago Chapter of the American Foundrymen's Society and a member of the AFS Malleable Research Committee as well as several Sand Division committees.

♦ ♦ ♦

Richard C. Cessna has been appointed assistant works manager, Fort Pitt Malleable Iron Division, McKees Rocks, Pa., division of Steel Trading Corp., Pittsburgh. For the last 6 years Mr. Cessna has been engaged in production and sales work at the Cleveland, Columbus and Ashtabula, O., plants of Lake City Malleable Co.

♦ ♦ ♦

E. M. Hunt, until recently production and quality control engineer, R. B. Carolin Foundry & Machine Co., Detroit, has joined American Magnesium Casting Co., Pontiac, Mich.

♦ ♦ ♦

Frank J. Oklessen has been named general manager, the Motor Patterns Co., Cleveland, succeeding **Anton F. Anderle,** who has retired after 30 years with the company. Mr. Oklessen joined the company as an apprentice wood patternmaker 16 years ago. Other recent appointments at Motor Patterns Co. include: **Edward W. Pierie,** plant manager, who has been succeeded by **William J. Hinchliffe** as foreman of the wood department; **Michael J. Dolan,** shop superintendent, and **Joseph C. Helus,** foreman of the metal department.

♦ ♦ ♦

T. Stanley Lovenduski and **Fred Severi,** partners in the new Delron Foundry, now under construction in Bridgeboro, N. J., plan to start production of iron, brass and aluminum castings about Dec. 15. Mr. Lovenduski entered the foundry industry 17 years ago at Thos. Devlin Mfg. Co., Burlington, N. J., and subsequently was associated with Florence Pipe Foundry & Machine Co., Florence, N. J., Madsen Machine & Foundry Works, Eddington, Pa., and Baldwin Locomotive Works, Eddystone, Pa., as a molder and foreman. Mr. Severi has spent 30 years as a molder and coremaker at Thos. Devlin Mfg Co., Baldwin Locomotive Works and De Laval Steam Turbine Co., Trenton, N. J.

♦ ♦ ♦

Arthur N. Dugan has retired as vice president, National Bearing Division, American Brake Shoe Co., St. Louis, but will continue with the company as a consultant. Mr. Dugan was graduated from Rider College and in 1927 became vice president of National Bearing Metals Corp., which later became a subsidiary, then a division of American Brake Shoe Co., New York. **Pearce D. Smith,** sales representative, National Bearing Division, has been transferred from Pittsburgh to the parent company headquarters, American Brake Shoe Co., New York.

♦ ♦ ♦

Albert E. Salatka has been appointed works manager and **Herbert F. Miller,** general superintendent, Marion Malleable Iron Works, Marion, Ind., subsidiary of Chicago Railway Equipment Co., Chicago. Mr. Salatka has been general superintendent of the Marion plant since 1948 and has served in various supervisory positions at the Marion and Grand Rapids, Mich., plants. Mr. Miller, a graduate of Harvard University, joined the company in 1949.

♦ ♦ ♦

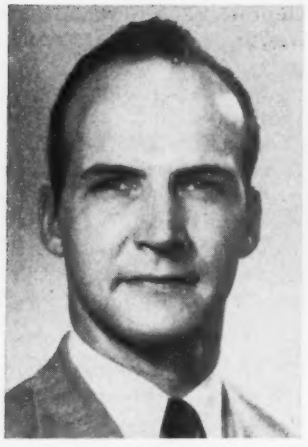
Samuel W. Gibb has been appointed vice president in charge of sales, C & D Batteries Inc., Conshohocken, Pa. Mr. Gibb, for the last year an agent for materials handling equipment in California, was formerly gen-

H. OLIVER PELS
. . . Eberhard Mfg. supt.

R. B. KROPF
. . . metallurgy, INCO, Detroit

C. T. HALLER
. . . INCO technician

ROBERT P. SCHAUSS
. . . Werner G. Smith sales



ROBERT SPURGIN III
. . . Cent. Indiana AFS Chairman

WILLIAM A. DE RIDDER
. . . heads California group

ROY W. BROWN
. . . Carborundum Co. sales

DR. ERNEST W. REID
. . . Chemical Society medalist

eral sales manager, Yale & Towne Mfg. Co., Philadelphia. He is a past president of the Materials Handling Institute.

♦ ♦ ♦

Robert Spurgin III, elected chairman of the Central Indiana Chapter of the American Foundrymen's Society for 1951-52, is in charge of development engineering and methods, Swayne, Robinson & Co., Richmond, Ind. Mr. Spurgin attended Purdue University and spent a year with Kalamazoo Stove & Furnace Co., and two years with Swayne, Robinson & Co. prior to military service. Following separation from the Army in 1945 he returned to Purdue, working in the foundry laboratory and engaging in foundry work during the summer. In 1947 he returned to Swayne, Robinson & Co. as melting foreman, became superintendent later and in 1950 assumed his present duties. Mr. Spurgin was vice chairman of the Central Indiana Chapter last year.

♦ ♦ ♦

William A. DeRidder, chairman of the board of directors, General Metals Corp., Los Angeles and Oakland, Calif., has been elected president of the California Manufacturers' Association. **Ralph M. Hoffman,** president of the Pacific Division, Link-Belt Co., San Francisco, has been named vice president. Mr. DeRidder was associated with Western Drop Forge Co. in 1930 when that company became part of General Metals Corp. Mr. DeRidder was appointed vice president of the corporation, and later became president.

♦ ♦ ♦

Roy W. Brown has been appointed direct sales representative in a new southwest sales territory recently opened by the Refractories Division, the Carborundum Co., Perth Amboy, N. J. Mr. Brown, a graduate of Rutgers University where he later was research associate and instructor, joined the company in 1947 and has been a product specialist for its fused cast refractories.

♦ ♦ ♦

Dr. Ernest W. Reid, president, Corn Products Refining Co., New York, recently was presented the Chemical Industries Medal, awarded by the American Section of the Society of Chemical Industry for conspicuous service to applied chemistry. Dr. Reid joined Corn Products Refining Co. in 1943, as vice president in charge of the Chemical and Research Division. He was elected a director in 1947 and has been president the last six months.

♦ ♦ ♦

Richard J. Kervick has been appointed abrasive engineer in West Virginia, with headquarters in Huntington, for Norton Co., Worcester, Mass. The territory was formerly handled by **Charles B. Martin,** Pittsburgh area field engineer. **Kenneth F. Ebbeson,** sales engineer, Worcester, has succeeded **David H. Paul,** who has been recalled to active Navy duty. Mr. Ebbeson will cover Arkansas, western Tennessee, Mississippi and Louisiana.

♦ ♦ ♦

C. Stuart Haagensen has been appointed director of industrial and public relations, Ampco Metal Inc., Milwaukee, following 12 years in that capacity with Allis-Chalmers Mfg. Co., Milwaukee.

♦ ♦ ♦

Lincoln Kilbourne has been named sales manager of the Conveyor Division, the Jeffrey Mfg. Co., Columbus, O. **C. G. Hawley** has succeeded Mr. Kilbourne as sales manager of the products engineering division and **L. Cole,** formerly sales engineer in the Columbus territory, has replaced Mr. Hawley as district manager, Jacksonville, Fla. **Paul Lawall** has been appointed sales manager of the General Engineering Division in Columbus and **R. W. Sweitzer** has succeeded him as district manager of the New York office. **W. K. Myers** has replaced Mr. Sweitzer as district manager in Philadelphia and **Paul Hendry** has been transferred from the Milwaukee sales office to succeed Mr. Myers as Boston district manager. **Dan Knies** and **A. W. Lemmon** have been appointed consultant sales engineers of the Conveyor Division in Columbus.

♦ ♦ ♦

S. C. Lloyd has been appointed sales manager of the Pre-Engineered Division, Mechanical Handling Systems Inc., Detroit, covering all standard materials handling equipment. Mr. Lloyd was formerly associated with Rapids Standard Co., Grand Rapids, Mich.

♦ ♦ ♦

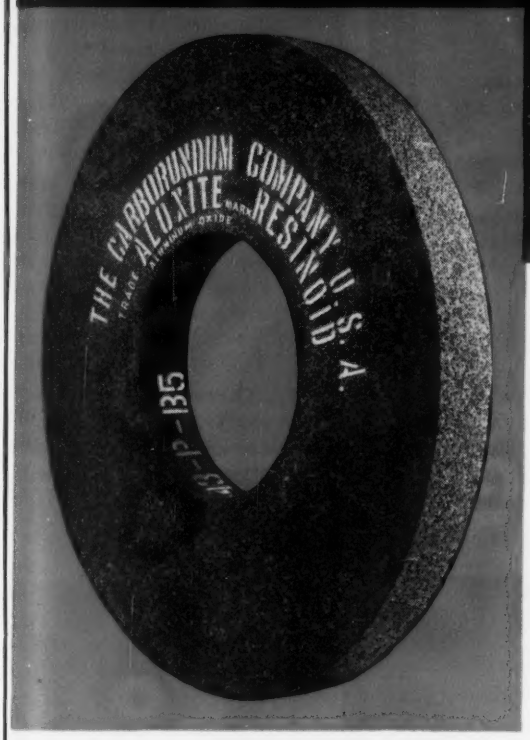
J. Morgan, who recently joined Foundry Services Ltd., Birmingham, England, has been appointed chief metallurgist at its Canadian plant, Foundry Services (Canada) Ltd., Guelph, Ont. Mr. Morgan was formerly chief metallurgist, Magnal Products Ltd., Bristol, England.

♦ ♦ ♦

Dr. Horace J. Grover has been named supervisor of research on fatigue and structural analysis; **Arthur D. Schwope,** supervisor of research in mechanical metallurgy, and **Henry A. Saller,** supervisor of research on special metallurgical materials, Battelle Memorial Institute, Columbus, O. **Charles F. Lucks** will supervise the institute instrument division. Dr. Grover, graduated from University of Rochester, took graduate work in physics at Cornell University and joined Battelle in 1942. Mr. Schwope was graduated from Marquette University and has been on the institute's research staff since 1946. Mr. Saller, a graduate of Purdue University, became associated

(*Concluded on page* 134)

CASTINGS GO THROUGH THE CLEANING ROOM FASTER with the right abrasive wheel



To keep castings moving through the cleaning room, use fast-cutting B5 resinoid bond snagging wheels by CARBORUNDUM. You'll like their rate of cut maintained throughout entire wheel life. Their higher factor of safety merits additional consideration. These wheels and bond types were designed to meet the grinding requirements of the most modern mechanized flow of castings through the cleaning room. However, any cleaning room operation will show reduced grinding time cycles. Specify B5 wheels in aluminum oxide grit for use on steel castings, forgings, welds and many non-ferrous materials; and silicon carbide grit for grinding of cast iron, gray and chilled iron, unannealed malleable iron and non-ferrous materials. Order from your local CARBORUNDUM distributor or salesman...or write Dept. F 81-36.

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G. P. FISHER K. L. SMITH ADEN PARIS T. A. CUTRI

These men are members of a team sponsored by the Economic Cooperation Administration which is consulting with the foundry industry of Italy. The group is headed by **George P. Fisher,** former vice president, Whiting Corp. **Kenneth L. Smith** formerly was with the Hansell-Elcock Co., Chicago. **Aden Paris** is a well known foundry consultant of Aurora, Ill., and **Thomas A. Cutri,** labor relations advisor who will serve as interpreter for the team, is from Steubenville, O.

(*Concluded from page* 132)

with Battelle in 1941 and has been engaged in research work there for the Atomic Energy Commission. Mr. Lucks, with Battelle's research staff since 1930, is a graduate of Ohio State University.

♦ ♦ ♦

Henry W. Howell, president, the Southern California Chapter of the American Foundrymen's Society for 1951-52, is president, Howell Foundry Co., Los Nietos, Calif. Mr. Howell, son of Willis T. Howell, who was identified with the foundry industry throughout his life, from the age of 14 worked during vacations in various foundry jobs including coremaking, patternmaking, cleaning and molding. He attended University of Minnesota and was later associated with several California foundries, including Pacific Malleable Castings Co., Oakland Kay-Brunner Steel Products Co., Alhambra, Western Malleable Casting Co. and Westlectric Casting Co., Los Angeles. In 1936 he organized Howell Foundry to produce gray iron castings and in 1945 the business was incorporated. Mr. Howell was vice president of the Southern California Chapter last year.

♦ ♦ ♦

Walter V. Napp, who for 5½ years has been associated in a sales capacity with the Badger Fire Brick & Supply Co., Milwaukee, has joined the Delta Oil Products Co. there.

♦ ♦ ♦

Andrew E. St. John was recently elected vice president-treasurer, Alloys & Products Inc., New York, where he will also be in charge of manufacturing operations. Mr. St. John, a graduate of Case Institute of Technology, has been associated with the nonferrous smelting industry for 26 years.

♦ ♦ ♦

Harry Oldham has joined the engineering staff, Sutter Products Co., Dearborn, Mich., where he will be engaged in development and design of new foundry equipment, particularly in the shell molding process. Mr. Oldham, who served a 7-year apprenticeship in England, was employed by various automotive foundries in Scotland until 1923 when he came to the United States. He was associated with Ford Motor Co. for 23 years as superintendent of its aluminum and magnesium foundries and in charge of cylinder block production. Until recently he was general foundry superintendent, Hunt-Spiller Mfg. Corp., Boston.

♦ ♦ ♦

Walter W. Walker was recently appointed research metallurgist, the California Research & Development Co., at the Livermore, Calif., laboratory of the Atomic Energy Commission. Mr. Walker served a 4-year apprenticeship in the U. S. Navy Yard foundry, Mare Island, Calif., and following Navy service attended University of Arizona where he was graduated last year. He worked in various West Coast foundries and until recently was foundry laboratory metallurgist in the gray iron foundry of Buick Motor Division, GMC, in Flint, Mich.

♦ ♦ ♦

A. J. Shradel has been appointed manager of the Seattle district sales office, Cutler-Hammer Inc., Milwaukee, succeeding **T. N. Bristow** who has retired. Mr. Shradel, with the company 15 years, has been in the Fresno, Calif., sales office since 1948.

♦ ♦ ♦

Emerson G. Hammack has been named manager of metal parts purchasing, the B. F. Goodrich Co., Akron, O. Succeeding him in his previous post as manager of engineering equipment purchasing is **Fred D. Stinaff.**

♦ ♦ ♦

William W. Timmis Jr. was recently appointed southern sales and service manager for the Heating Department, Dravo Corp., Pittsburgh, with headquarters in Atlanta.

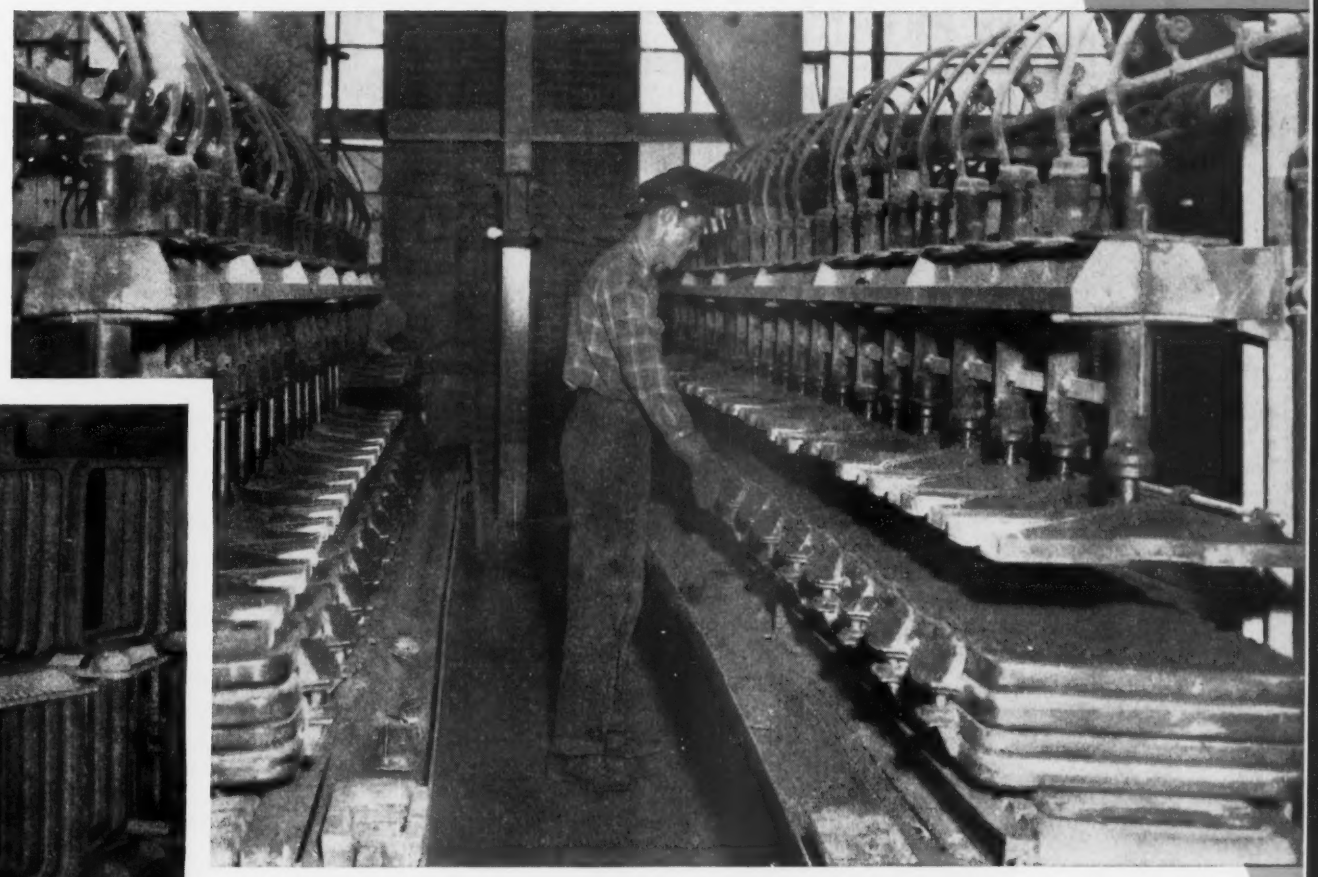
HENRY W. HOWELL
. . . heads S. California Chapter

WALTER V. NAPP
. . . joins Delta Oil Products

ANDREW E. ST. JOHN
. . . v. p., Alloys & Products

HARRY OLDHAM
. . . engineer, Sutter Products

How PRIER Speeds Brass and Aluminum Casting with BS&B Foundry Flasks



More than 1,000 light weight fabricated steel BS&B Foundry Flasks are speeding production in the progressive and ultra-modern Prier Brass Mfg. Company foundry at Kansas City, Missouri. Prier is one of the Mid-West's largest manufacturers and custom fabricators of plumbing supplies.

Lighter, faster to handle, these BS&B flasks do not sacrifice strength. Easily handled by one man, they will increase the number of molds per man-day. The **inner corrugation** on these BS&B flasks eliminates the need for an extra reinforcing bar—and makes it possible to stand the flasks on their side on the molder's bench or conveyor system without support or clamping. Modern, economy-minded foundries like Prier Brass Mfg. Company have standardized on BS&B flasks, because they increase production, handle easier and last longer. Some of Prier's BS&B flasks have been in daily service for **more than 16 years!**

Management and molders both prefer BS&B Flasks, precision built by foundrymen, all welded construction and of full-gauge steel.

BS&B flasks are made in round, square and rectangular shapes, for light, medium or heavy duty. Pinlugs, available in all styles, are standard equipment and can be arranged in any combination you desire. Special BS&B flasks can be made to your specifications.

Write today for your copy of the BS&B Foundry Flask Catalog—with complete specifications, diagrams and much useful handbook information for the foundryman.

FOUNDRY BS&B FLASKS

BLACK, SIVALLS & BRYSON, INC.

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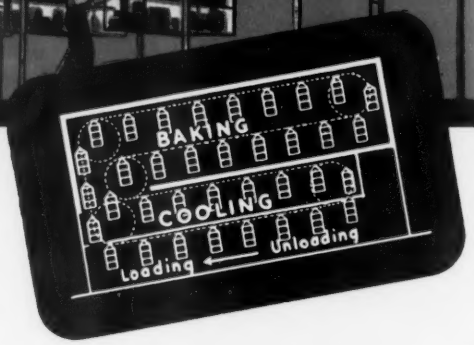
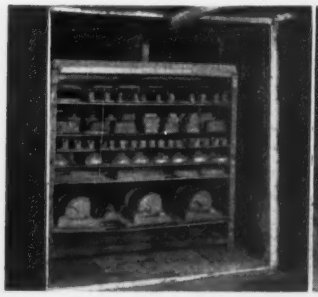
GET MORE WORKING SPACE FROM PRESENT PLANT

DESPATCH
ELEVATED CONTINUOUS CONVEYOR
CORE BAKING OVEN

DESPATCH combination gas-oil fired oven, 13 ft. wide, 27 ft. high, 52 ft. long. Has variable speed continuous conveyor. Cores make horizontal passes thru bake chamber, (see diagram) then enter fan-equipped cooling section.



DESPATCH conveyor ovens help boost core output-per-man as loading and handling are greatly simplified. Foundrymen appreciate the labor-saving features of DESPATCH Conveyorized Ovens.



Intermittent monorail conveyor DESPATCH oven with swing doors at both ends.

DESPATCH core and mold oven with heavy duty, electrically operated lift door.

This ingeniously designed DESPATCH oven gave foundrymen more working space from their present plant and increased core baking output at the same time. It provides ample baking capacity up to 84 tons per day and gives the foundry much needed floorspace. The oven is built to carry 38 long (7½′ x 2′ x 3′) core racks suspended from a continuous conveyor chain.

DO THESE ADVANTAGES INTEREST YOU?

1. SAVES FLOORSPACE: Platform-mounted heater, fans, controls, plus compact overall design, allow more work space on foundry floor.

2. ALLOWS FAST, EASY HANDLING: Built-in cooling section provides fast, uniform cooling. Eliminates fumes. Provides speedy unloading and reloading without delay.

3. STRAIGHTENS COREMAKING LINES: Unique design permits single open loading—unloading area, easily reached from all sides. Accommodates wide range of core sizes.

4. REDUCES BAKING COSTS: Efficient system recirculates up to 75% of heated air. Guarantees fast, even, low-cost baking.

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DESPATCH OVEN COMPANY

GRAY IRON FOUNDERS' ANNUAL MEETING

Stresses Quality Control, Defense Work

By FRANK G. STEINEBACH
Editor
FOUNDRY

TWO discussion panels, one devoted to quality control and the other to defense production, drew exceptional interest at the 23rd annual meeting of the Gray Iron Founders' Society held at the Edgewater Beach Hotel, Chicago, Oct. 25-26. Attendance was one of the largest in the society's history.

The quality control discussion, featuring "Installation and Practical Value of Foundry Quality Control Programs in Large and Small Foundries," was sponsored by the recently organized quality control committee of the society. H. W. Stuart, U. S. Pipe & Foundry Co., Burlington, N. J., and chairman of that committee, introduced the discussion, and Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., was panel chairman. Mr. Stuart explained that the panel was developed to stimulate thinking on quality control by the gray iron industry. A questionnaire recently sent the industry showed that two-thirds of the respondents recognize the need for a quality control department. Most of those operating such a department have had it for only a few years, some for as long as 12 years.

U. S. Pipe & Foundry Co. has operated a quality control department the last four years. Mr. Stuart indicated that quality control is the quality component of scientific management. There may be some confusion between statistical quality control and quality control, but the former is only a phase of the quality control program in any foundry. Those who do not make use of statistical quality control to find out the tricks of the field, are missing a bet, according to Mr. Stuart.

The speaker showed slides illustrating the program in the various plants of his organization. He indicated that the quality control engineer must report to plant management and be on a par with the plant engineer, production engineer, personnel director and metallurgist. At times quality control will lock horns with other departments in such matters as costs, etc., and therefore it is necessary that differences be settled by one not handling production.

C. V. Slathar, Minneapolis-Moline Co., Minneapolis, outlined his own work and explained that the quality control department and the inspection department are separate but are operated by one head. He stated that his department endeavors to develop statistics for foundry foremen and metallurgists so that they can use them as a production tool. He used a series of charts to show how quality control has helped improve production or decrease losses. Chart 1 illustrated variations in piston inside diameter involving green sand molding equipment. This study permitted foundry management to secure a change in size specifications and to determine sand mixtures giving the desired inside diameter. Chart 2 helped foundry management correct hardness of pistons and proved that the pistons had to remain a little longer in the mold before shakeout. Chart 3 showed a study made on a manifold where scrap was reduced. Chart 4 showed total foundry scrap and salvage charts posted daily in the manager's office to indicate the per cent of scrap salvaged for the entire foundry and also for each individual department. Chart 5 showed comparisons of rough casting inspection fixture with machine castings inspection fixture.

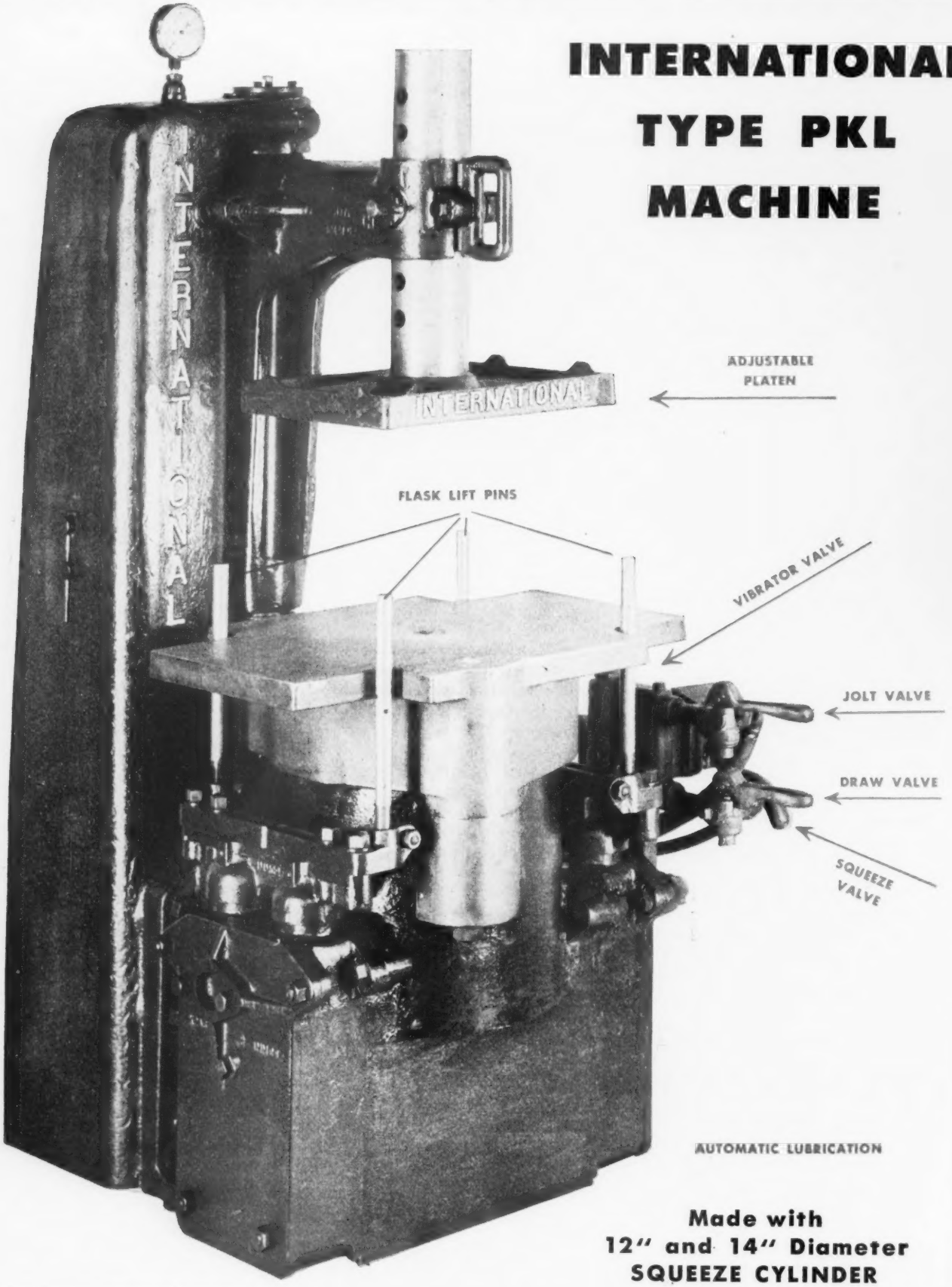
Dr. A. E. Schuh, U. S. Pipe & Foundry Co., Burlington, N. J., discussing "Quality Control for Research and Development," indicated that quality control is primarily a management aim at obtaining economic quality for a given product. The quality control department must understand raw materials requirements, process control, cupola control, sand control, heat treatment control, and product inspection. Other functions include complaint analysis and preparation of specifications. At the same time, Dr. Schuh pointed out that quality control is not responsible for such things as normal purchasing routines, sales relationships, advertising activities, developments in improving production processes and products, labor problems, auditing, etc.

According to Dr. Schuh the only thing new about quality control is the recognition that its problems are the full-time concern of a separate organization. The head of the quality control department must be somebody with a reasonably good engineering training. He must be able to recognize the need for tests and develop them. He must know how the plant operates and must possess quantitative common sense. He must be able to measure the returns for what they cost. Dr. Schuh recommended the use of charts in reporting since they permit one to obtain information at a glance which would

(*Continued on page* 140)

Luncheon gathering at the annual meeting of the Gray Iron Founders' Society in Chicago

INTERNATIONAL TYPE PKL MACHINE



Made with 12" and 14" Diameter SQUEEZE CYLINDER

INTERNATIONAL MOLD

LA GRANGE K

INTERNATIONAL TYPE PKL MACHINE

JOLT, SQUEEZE, AIR PIN LIFT

This machine is of a very rugged character. The column, squeeze head and platen are made of cast steel. The squeeze cylinder, squeeze piston, jar cylinder and jar table are made of wear-resisting iron.

All parts subject to wear have replaceable bushings of either brass or hardened steel. There is a threaded adjustment on the lower ends of the lift posts so that they can be set at the right height to suit the thickness of the pattern plates to be mounted, and the centers of the lift posts can be readily set to suit the sizes of flasks to be used,—note specifications on the following page. Type PKL comes equipped with pop valves, air gauge, vibrator and cleaner valve.

DG MACHINE COMPANY

E K, ILLINOIS

For his outstanding service to the industry and the Society, Walter L. Seelbach (right) receives the GIFS gold medal from President E. L. Roth

President Roth's activities in the society were recognized by a citation. A. C. Denison, Fulton Foundry & Machine Co., makes the presentation

(*Continued from page* 137)

require lengthy written text.

Quality control is needed because industry has definitely evolved from a state of art to a state of engineering, Dr. Schuh said. The foundry industry is getting more complex and will continue to do so. He pointed out that the ability to conduct research tests in plants is difficult because of the lack of control, but progress is being made.

Max Kuniansky stated that the problem of quality control is not a fixed destination but a constant striving to improve. Quality control differs from other types of operations since the man who heads the department should not report to the man who is responsible for production of castings. One must have someone pass on quality besides himself. Mr. Kuniansky described operation of the Lynchburg organization, and said that by converting 1 per cent of the lost castings to good castings through quality control, the company would add approximately $105,000 a year to the value of its saleable product. Since castings are shipped in the as-cast condition and are machined in the customer's plant, quality control has a splendid opportunity to eliminate defects and thus reduce the cost of machining and loss through defective castings.

Mr. Kuniansky emphasized that quality control is a way of thinking, a philosophy of management. It must start with the president of the company and it cannot be delegated. Management must give support to the department handling quality control and must see that it is a staff function properly integrated. Mr. Kuniansky showed a number of slides illustrating production methods and quality control applications at the Lynchburg foundry.

Tom E. Eagan, Cooper-Bessemer Corp., Grove City, Pa., and Alexander Barczak, Superior Foundry Inc., Cleveland, presented written discussions to the panel.

The defense production discussion featured consideration of "Military Castings Requirements and Materials Controls" by Maj. Gen. F. H. Griswold, military director for requirements, and chairman, Foundry Industry Advisory Committee, Munitions Board, Washington, and by A. J. McDonald, chief, Castings Section, Iron and Steel Division, National Production Authority, Washington.

General Griswold outlined the setup and functioning of the Munitions Board and discussed problems in stockpiling strategic materials, especially those from outside countries. The Munitions Board has no money to purchase materials and services, but sees that the military services get the things needed or specified in plans drawn up by the joint chiefs of staff, without disrupting civilian production unduly. General Griswold said the direct take of steel for the military is about 9 per cent at present and may go as high as 12 per cent in 1952. However, the amount of steel required for military supporting activities is greater. General Griswold said the value of industry advisory committees lies in helping government plan for future needs. Present problems usually require action before such meetings can be held.

A. J. McDonald outlined the need for greater quantities of ferrous scrap. Scrap inventory declined each month this year, except July, and unless there is a marked increase in scrap volume, it will be practically impossible to reach projected production goals this winter. He advised those foundrymen who have neglected to dig out scrap in their own plants to get busy, for they will be pleased at the results.

Mr. McDonald reported that pig iron is a little easier. The decline in demand for some types of iron castings is responsible, but increased blast furnace capacity and heavier imports have played significant parts. Mr. McDonald complimented producers of castings in stating that, except for the Midwest flood area, it had not been necessary to put a directive on any ferrous foundry in connection with the defense program.

George C. Nixon and Clark Nixon, Pension and Profit Sharing Planners, LaCrosse, Wis., presented an interesting discussion on the practical considerations of profit sharing. They also described some of the features of the plan now being used in several foundries.

In opening one session devoted to reports of society activities, E. L. Roth, Motor Castings Co., West Allis, Wis., and president of the society, indicated that the organization has developed greater national and international prestige, especially

(*Continued on page* 142)

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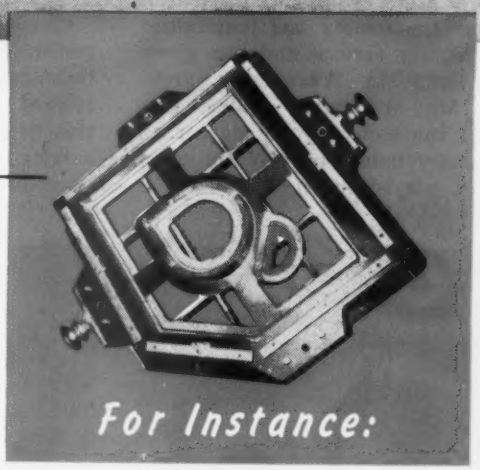
The skill of a fine tailor adds distinctiveness to your apparel AND . . . a substantial premium to the price. A premium that you *never get back* in dollars and cents! That's NOT TRUE at Buffalo!

Here at Buffalo Pattern, fine craftsmanship is not a mandate from management, but a credo that has been taught by father to son for over half a century. Sure, skilled craftsmen cost as much here as they do anywhere else, but the precision, the patience and the pride of a job well done, by a man who feels he has a craft, cannot be bought at ANY hourly rate!

That's why our engineering staff can accept your "fussiest" jobs, jobs of any size, plan them to the nth degree, and turn them over to our shop with the assurance that the equipment will fit your set-up like a well-tailored coat. There's no extra rigging or adapting necessary. You receive equipment that is tailor-made to *precisely* fit your job, your production schedules and your foundry.

Yes, you may pay a little bit more for a Buffalo Pattern and you may travel a little farther . . . but, it's all well worth it! This kind of equipment cuts your scrap ratio to the minimum and returns your tailor-made "premium" a thousandfold.



This all-machined, heat-treated Meehanite Arbor, one of many duplicate sets in this pattern equipment, replaces the Drag half mold in the production of large automatic transmission castings. Drag cores are set with gages in this Arbor and a similar Arbor, housing Cope and Riser cores, is closed over this Drag assembly with Pin Fixtures. Entire unit is then bolted together for pouring.

Here again, Buffalo engineering and precision construction has effected tremendous savings in sand and labor cost, increased molding machine capacity and production schedules with only a negligible increase in pattern costs.

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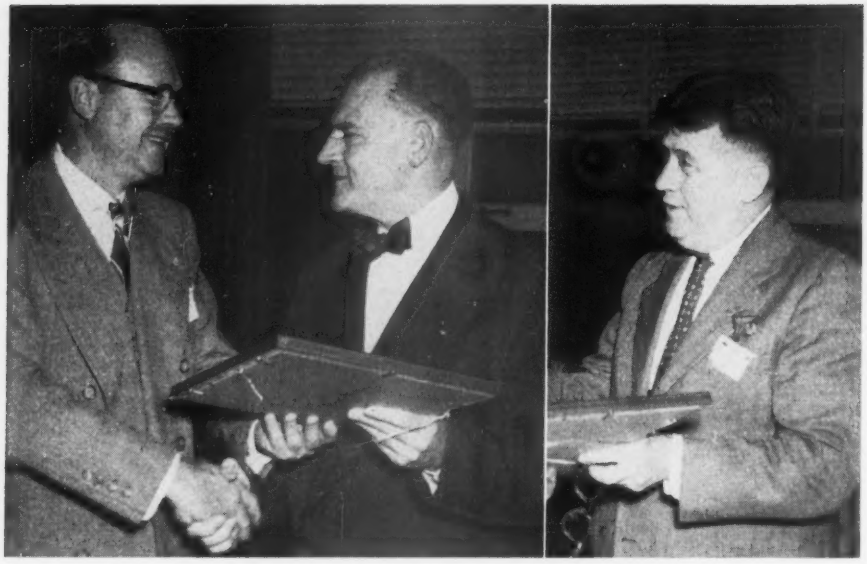
DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY



Citations for meritorious service to the society and the gray iron industry are presented by Mr. Roth to Robert G. Schaefer (center), Schaefer-Goodnow Foundries Inc., Pittsburgh, and Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

(*Continued from page* 140)

in Washington. Both industry and government now recognize the society as the group closest associated with the gray iron industry, the second largest branch of the metalworking industry. Henry J. Trenkamp, Ohio Foundry Co., Cleveland, and treasurer of the society, reported the organization in healthy financial condition.

Donald H. Workman, executive vice president, reported that during the year the society has maintained every regular service and has given top priority to Washington problems. Mr. Workman outlined the work of the society in strengthening the foundry industry in Washington, the part played in the organization of the Iron and Steel Casting Section, the appointment of Gray Iron Advisory Committees to the NPA and the OPS, and contacts with other defense agencies. He briefly outlined the various society activities reported in more detail later by chairmen of the various committees. During the year, 50 new members joined the society. Mr. Workman announced that the 24th annual meeting of the society will be held in Cleveland, Oct. 16-17, 1952.

Charles O. Burgess, technical director, stated that activities of the technical department were directed toward encouraging better production methods and informing the consuming public of the real value and economic advantages of gray iron castings. Mr. Burgess referred to the manuals already prepared, which will become part of a handbook, and said that the new manual on heat treatment of gray iron castings now is being prepared. He referred to the general technical program, which includes consultation, service to members, contacts he has made with federal agencies, and he indicated that technical activities of the society must expand if it is to meet the demands of industry.

Earl H. Thompson, H. P. Deuscher Co., Hamilton, O., chairman of the advertising committee, presented a report showing how the advertising appropriation was spent and recommended an increase in the advertising budget. The committee recommended the advertising be made more competitive where gray iron has definite advantages.

A. E. Hageboeck, Frank Foundries Corp., Moline, Ill., and chairman of the cost committee, said that the cost program of the society is designed to make all gray iron foundrymen cost conscious. Cost manual No. 1 of the society now is accepted as the standard basic cost system for all gray iron foundries, and cost manual No. 2 supplements the first manual by describing more advanced methods as a guide in collecting cost information when advanced methods of production are employed. Mr. Hageboeck reported that the work of local cost groups has been most productive and that selling the cost program has been helpful in increasing society membership.

Hermann P. Good, Textile Machine Works, Reading, Pa., chairman of the handbook committee, reported on

(*Concluded on page* 145)

GIFS officers and newly elected directors. Clockwise from left foreground: T. I. Curtin Jr., William Morley, J. E. Quest, G. I. Gilson, E. P. Trout, R. G. Schaefer, D. H. Workman, E. L. Roth, H. J. Trenkamp, H. P. Good, Max Kuniansky, S. D. Russell, W. O. Larson, G. E. Mellow, C. H. Ker

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the manuals already published and those in process. He said wide circulation of this material would be most advantageous to the foundry industry, and urged all members to assist in the distribution. He stated that the handbook would be completed in 1953.

Harold Wheeler, Superior Foundry Inc., Cleveland, reported that the safety committee has distributed 50,000 safety booklets. The committee recommended that members submit details on safety work for publication. The suggestion also was made that the safety committee publish periodic bulletins dealing with safety practices in gray iron foundires.

C. R. Culling, Carondelet Foundry Co., St. Louis, reported a change in the form of the monthly statistical report and in the base period. The new base period will be the first six months of 1951 and the committee will review the base period from time to time. Mr. Culling asked for greater participation in the number of plants submitting statistics for these reports. He pointed out that representative, reliable statistics are necessary in dealing with government agencies.

Technical Committee Report

E. C. Hoenicke, Eaton Mfg. Co., Detroit, reporting for the technical committee, discussed co-operation with the handbook committee and the supervision of technical work of the society. He outlined in some detail the various activities of the technical director and announced the appointment of the quality control committee.

Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O., reported no action had been taken on the terms and conditions of sale since the last report. These terms and conditions originally were approved by the National association of Purchasing Agents some years ago and were re-approved as corrected in 1949. Wide publicity has been given to them over a period of years.

E. L. Roth reported that the National Castings Council continues to provide a clearing house for the nine individual groups in the foundry industry. Walter L. Seelbach reported on the meeting of the Gray Iron Advisory Committee to the NPA, and C. R. Culling reported on the work of the Gray Iron Advisory Committee to the OPS.

After being introduced by John M. Price, Ferro Machine & Foundry Inc., Cleveland, and president of the Foundry Educational Foundation, George K. Dreher gave an interesting review of the many accomplishments of FEF since its organization. Mr. Price then stated that a new system of membership is being inaugurated which should assure the future of the FEF and its service to the industry.

A price control clinic, devoted to discussion of CPR-60—"Casting Price Regulation," was tops in audience participation. Many spoke, either to voice opinions or ask questions. Regret was expressed that OPS had declined the society's invitation for a representative to appear on the program and give counsel on the document and its application.

Three of the society's 1951 officers re-elected for 1952 are: President, E. L. Roth, Motor Castings Co., West Allis, Wis.; vice president, R. G. Schaefer, Schaefer-Goodnow Foundries Inc., Pittsburgh; and treasurer H. J. Trenkamp, Ohio Foundry Co., Cleveland. H. P. Good, Textile Machine Works, Reading, Pa., was elected the new secretary.

Six new directors were named as follows: T. I. Curtin Jr., Waltham Foundry Co., Waltham, Mass., C. H. Ker, Dalton Foundries Inc., Warsaw, Ind.; Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; William Morley, Olney Foundry Division, Link-Belt Co., Philadelphia; J. E. Quest, J. F. Quest Foundry Co., Minneapolis; and E. P. Trout, Lufkin Foundry & Machine Co., Lufkin, Tex.

Walter L. Seelbach, president, Superior Foundry Inc., Cleveland, was awarded the gold medal of the society for his outstanding contribution of leadership and unselfish service to the society and to the gray iron industry generally. Mr. Seelbach served as its first president, 1928-1930, and again occupied that office in 1943-45. He was treasurer in 1935-37, and a director for 13 years.

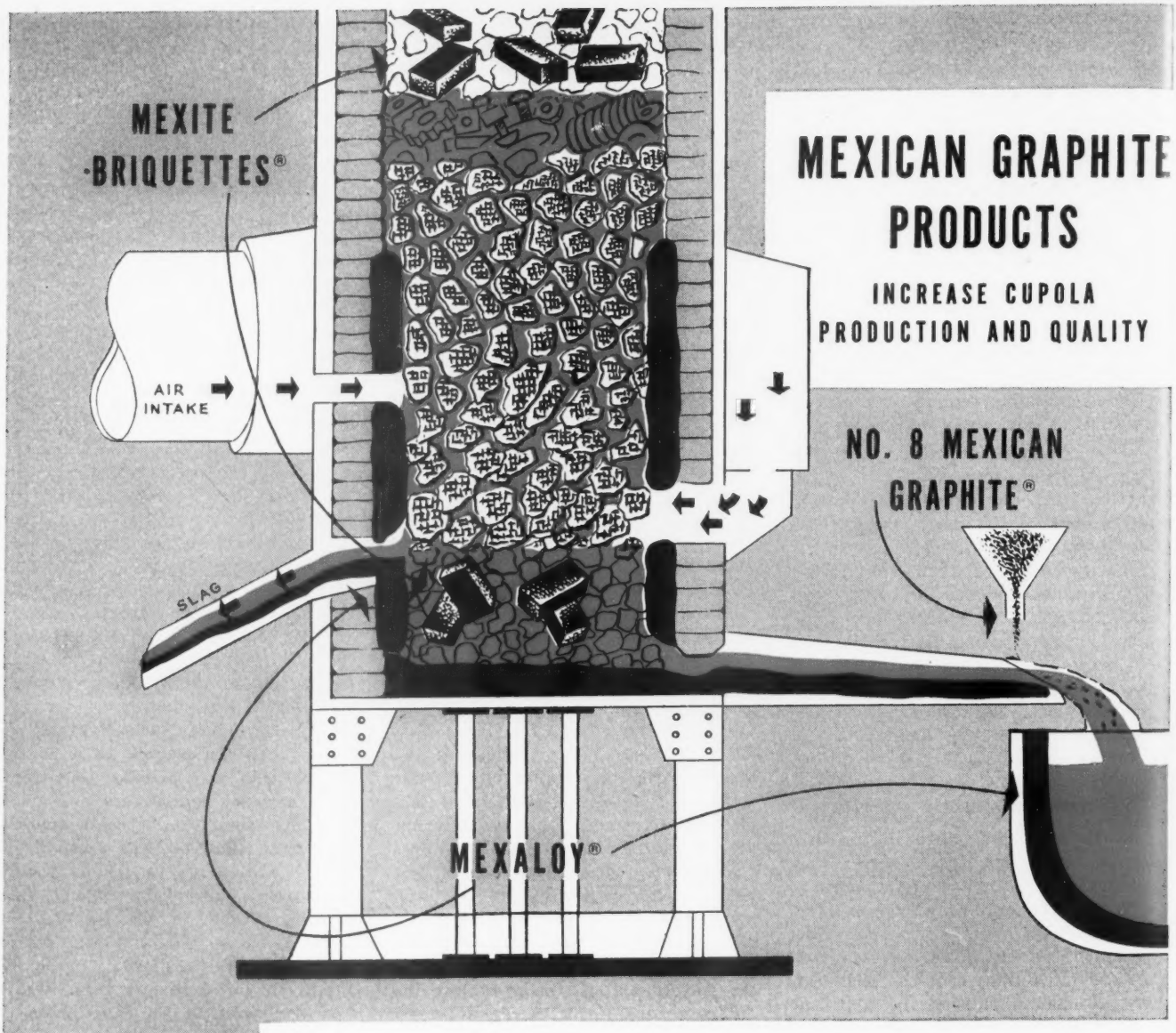
Edward L. Roth received a citation for his outstanding leadership and contribution to the progress of the society by serving as president in 1950-1951, as a director for four years, as chairman of the technical committee, vice chairman of the statistical committee, member of the handbook committee, member of government advisory committees and for his energetic efforts to promote the interests of the society.

Robert G. Schaefer was awarded a citation for his sincere and meritorious service to the society, serving as vice president, secretary and as a director for five years, and for his constant efforts to increase membership and advance the industry.

Max Kuniansky received a citation for his outstanding service to the industry embracing both far-reaching and fundamental scientific contributions to the art of iron founding, freely shared with other foundrymen, and the promotion of the common welfare of the industry and the society through service as a society director and as a member of government advisory committees.

In the society's redesign contest, first prize of $200 was awarded to W. C. Eccles and T. O. Kuivenen, Cooper-Bessemer Corp., Mount Vernon, O. Winner of the second, $100 prize was Joseph L. Grenko, Textile Machine Works, Reading, Pa. J. D. James, Cooper-Bessemer Corp., Grove City, Pa., won the $50 third prize.

CONVENTION: Pettibone Mulliken Corp., Chicago, recently held its regular semiannual sales convention at Moraine-on-the-Lake, Highland Park, Ill. Sales managers of the various product divisions, corporation executives and regional sales managers met in four days of sessions for policy discussions and to learn of new product development. Shown above are regional sales managers and the company president. Front row, left to right: Alex E. Ainlay; Charles O. Stewart; E. J. Seifert, president; Ted R. White, and Claude W. Cadarette. Back row: Ralph A. Brown, C. Kenneth Smullen, and Jack C. Rogers. J. B. Jones was absent



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MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also *reduce the range of carbon content fluctuation* and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is *easily applied to any clean surface.* Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

No. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, *producing castings of increased machineability.* Normally only 2 lbs. of No. 8 need be added per ton of molten metal — a cost of only ten cents per ton — to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

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THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

By EDWIN BREMER

Foundry DEVELOPMENTS

NUCLEATION of some cast metals and alloys by applying metal powders to the face of a standard mold has been investigated by J. A. Reynolds and C. R. Tottle by comparing the grain size of the surfaces produced with and without the coating. Reported in the October, 1951 issue of the *Journal* of the Institute of Metals (London), the authors point out that, in general, powdered metals having the same crystallographic form as the metal being cast are effective as nucleating agents, provided that the degree of lattice "misfit" does not exceed 5 per cent, or in some cases 10 per cent.

This simple mechanism is found to apply to the solidification of tin, lead, zinc, antimony, aluminum, magnesium and copper. Where the cast metal readily formed an oxide film, reduction of this film to the metal was found to occur when some coatings were applied, giving rise to simple homogeneous nucleation by the particles produced. Homogeneous and heterogeneous nucleation of alloys can take place under the same conditions as with pure metals, the crystal structure of the solid first formed from the melt being the ruling factor. Reduction of oxide films also occurred, and in the case of an 18:8 austenitic steel resulted in isomorphous nucleation of the delta solid solution by chromium particles reduced from the film.

* * *

COMPREHENSIVE study of the mechanical properties of chromium-plated SAE 4130 steel by Hugh L. Logan, National Bureau of Standards, Washington, provided some interesting information on plastic deformation of such steels used in aircraft. Investigation was sponsored by Bureau of Aeronautics, Navy department, and included tensile, tensile impact, bending and crushing tests of specimens prepared from rod and tubing. Data obtained indicate that baking the chromium-plated steel at temperatures from 200 to 440°C (392 to 824° F) increased substantially the ability of such steel to undergo plastic deformation.

* * *

WARPING and shrinking of zinc-base alloys dies used in forming aircraft parts has been reduced by techniques developed by Armour Research Foundation, Illinois Institute of Technology, Chicago, under contract to the Industrial Resources Division, Air Materiel Command. The new method for casting constant-tolerance, forming dies was shown to West Coast aircraft executives at Northrop Aircraft Inc., Hawthorne, Calif., Oct. 30. It involves development of close-tolerance patterns and methods of controlling solidification of the alloy in the mold. In the demonstration the new practice reduced shrinkage on a test die 6 ft long, 1 ft wide and 10 in. deep from 0.110-in. per ft to 0.015-in. per ft. "Barbering"—the labor required to bring the die within the desired tolerances—was reduced 75 per cent.

* * *

NEW high-intensity viewer or illuminator developed by General Electric Co., Milwaukee, permits penetration of exographs with film densities from 0.5 to 4.5. Unit contains an iris diaphragm which can be steplessly dilated or contracted from a 5-in. circle to a ¼-in. triangular opening, and a new 100,000-candle-power lamp with an average life of 1000 hr at 115 v.

* * *

DETAILS of the newly developed tin-nickel electroplate are presented in a pamphlet "Electrodeposited Tin-Nickel Alloy Coatings" by Parkinson, Britton and Angles available from Tin Research Institute Inc., 492 West Sixth Ave., Columbus, O. Coating containing about 65 per cent Sn and 35 per cent Ni is said to be comparable to the traditional chromium on nickel. It remains bright when exposed to the atmosphere and to many liquids and sprays which corrode other metals, and can be used as a material of construction in chemical engineering plants as well as in decorative plating. On steel an underlay of 0.0005-in. of copper is desirable to prevent pore-rusting. Recommended electrolyte bath contains, per liter: 50 grams stannous chloride, 300 grams nickel chloride, 28 grams sodium fluoride and 35 grams ammonium bifluoride. Operating temperature is 65° C with an average current density of 25 amp per sq ft.

* * *

CRITICAL situation relative to columbium has led to the issuance of Emergency Alternate Provisions EA-A 296 which, when specified, may be used as an alternate in ASTM Tentative Specifications for Corrosion-resistant Iron-chromium and Iron-chromium-nickel Alloy Castings for General Application (A 296-49T) and affect only the requirements referred to: Table II.—In view of the limited availability of columbium (with the heretofore usual small percentage of tantalum) the stabilizing addition to grade CF-8C shall consist of columbium plus tantalum. The ratio of columbium to tantalum (in relation to the carbon content of the steel) and the maximum of each element, or of one of them, or of the two combined, shall be determined in accordance with the requirements of the end use and shall be as mutually agreed upon by producer and purchaser.

* * *

PROGRESS in understanding how the atomic arrangements within a metal determine its structural properties is summarized in a symposium on "Plastic Deformation of Crystalline Solids" now available to the public, according to Office of Technical Services, U. S. Department of Commerce, Washington 25. Sponsored jointly by Carnegie Institute of Technology and Office of Naval Research, the symposium contains 19 papers by authorities in special areas of plastic deformation of crystalline materials. According to the publication, advances in this field are such that research at the present rate will result in an understanding of most of the basic phenomena of plastic deformation within five or ten years, and permit engineers to design the kind of metal they want. Copies of the symposium, designated PB 104 604 and containing 226 pages, sell for $3.50.

AROUND THE COUNTRY

News Reports from • • •

Philadelphia

ORDERS for small gray iron castings are not sufficient to maintain backlogs. Hence district shops engaged in this work are now going along on more or less of a hand-to-mouth basis. Most shops are still operating five days a week, but are cutting down on working forces in some cases.

Gray iron foundries engaged in heavier work are in much tighter position. These shops have backlogs of two or more months on an average, due primarily to an increasing flow of orders for machine tool castings, along with a good demand for components for diesel engines and material handling equipment, among other requirements. Soil pipe foundries are doing fairly well, although the sanitary ware people are getting caught up. There is little direct munitions work in the Philadelphia area.

Delivery promises on steel castings range 15 to 20 weeks. Apart from armor plate castings there is not much in the way of direct munitions. However, tooling-up requirements are running heavy, with active demand also from railroads and manufacturers of large motors, hydraulic pressure pumps and similar equipment.

Malleable demand has become a bit spotty, due to a lag in automotive work and in certain other durable lines. However, agricultural requirements are holding up well; also pipe fittings and motor truck components. Malleable deliveries are still well extended, but not as tight as they were a couple of months ago.

Bronze and brass foundries have plenty of business, but are having a terrific time getting raw materials. As a result, various plants are not able to keep going more than four days a week. Aluminum foundries are finding the raw material situation a bit easier, but are still having their difficulties. Malleable shops report a continued stringency in malleable scrap but see a slight betterment in pig iron supply. Steel foundries, operating five days a week and pouring on the sixth day, are able to keep abreast on raw materials, but that is about all. They are getting somewhat more aluminum for deoxidizing purposes; this had been quite a problem over recent weeks.

Gray iron shops report an adequate supply of pig iron for current operations. But they notice a tightening in supply of cast grades of scrap and in most cases are unable to build up much in the way of inventories. The latter applies to pig iron as well as scrap. Little foreign iron is being purchased because of premium prices. Some is still coming in, against old orders.

Chicago

PROSPECT for converting the surplus aluminum foundry at the Aircraft Engine Division of Ford Motor Co. here to production of magnesium castings still looks bright. At the request of Wright Field, Dayton, O., Ford recently surveyed the facility and reported on what the conversion will involve and the cost.

If the changeover is undertaken, the magnesium castings produced will be for the use of various aircraft makers over the country and presumably the operation would be under Ford direction. Ford's own needs will be accommodated fully by the original magnesium foundry now almost completely rehabilitated and in partial production.

At the beginning of 1951 Ford took over the huge plant which Chrysler Corp. built and operated during World War II as the Dodge Chicago Plant to build aircraft engines. The property had twin foundries—one for magnesium, the other for aluminum. The former, with modifications, is ample for Ford's needs, thus the latter became surplus because present-day aircraft engines use forged aluminum cylinder heads instead of cast aluminum heads as in the last war. Increasing need for magnesium castings for aircraft use is prompting the Air Force to undertake the conversion to satisfy this demand.

Adequacy of scrap for foundry use this coming winter depends in part on the level of castings demand in the months ahead. Many gray iron shops, particularly those serving the automobile and consumer goods industries, are suffering sizable orde reductions. Backlogs of many job bing foundries are very low and melt ing rates are irregular and well be capacity. As a result, demand cast scrap has fallen off sharply. U. less requirements pick up soon, sup ply is expected to be sufficient.

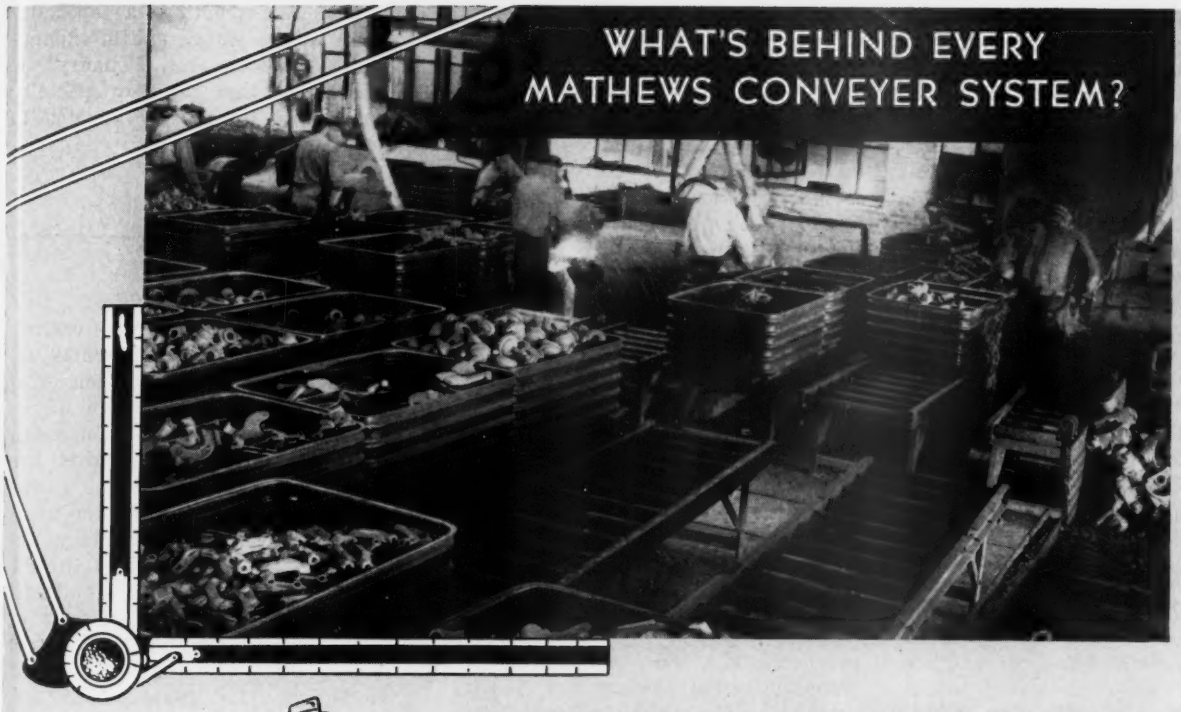
Foundry coke is in a similar category and no shortage is anticipated. Pig iron suppliers find ready takers for all the metal available, but the heat is off as far as deliveries are concerned. Foreign iron is still offered but is attracting little interest. Delivered in this area, foreign iron costs $90 to $100 a ton and this premium over domestic iron is more than gray iron foundries care to consider.

Los Angeles

FOUNDRYMEN are looking for new business to offset slackening in orders from customers not in defense work. Since July bookings by district iron foundries have fallen an average of 15 per cent, principally because casting users are hard hit by materials shortages and production restrictions.

For instance, slackening of building construction has cut pipe foundry business 40 to 60 per cent and reduced working shifts of those foundries from three to one. One heater manufacturer supplying the building

(*Concluded on page* 150)



A BALANCED ENGINEERING STAFF

● No one can be all things to all people, and a conveyer engineer is no exception to this rule. In the large corps of Mathews Engineers, in the field offices and at the three plants, are many specialists in one or more of the various types of equipment we manufacture, and in the industries which we serve. Some are especially skilled in the design and application of Belt Conveyers. Others are specialists in the design of heavy conveying machinery. There are experts in foundry conveying problems, and those with special understanding of the design and application of Steel Mill conveyers. And so on. There are creative men, experienced detailers, and engineers specializing in the application of electrical and hydraulic equipment. It is indeed a balanced engineering staff. And, that's why we can say, "Whether a load weighs 1 pound or 50,000 pounds, it is a job for Mathews Engineers."

Engineering offices or sales agencies are located in principal American and Canadian cities.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

MATHEWS CONVEYERS

GENERAL OFFICES *Mathews Conveyer Company . . . . Ellwood City, Pennsylvania*
PACIFIC COAST DIVISION *Mathews Conveyer Company West Coast . . San Carlos, California*
CANADIAN DIVISION *Mathews Conveyer Company, Ltd. . . . . Port Hope, Ontario*

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 148)

trades, due to curtailed production, has not ordered castings since July. Some ferrous foundries have reduced work schedules to four days a week. At the same time, foundries supplying designers and builders of refineries, manufacturers of refinery equipment, and electric motor and aircraft manufacturers are busy.

Nonferrous foundries are in good shape order-wise. Aluminum foundries supplying the expanding aircraft industry expect capacity operations for the forseeable future, but with no prime defense work going on in the West coast calling for iron and steel castings, Food Machinery's tank program at San Jose, Calif., the overall prospect for improvement in ferrous foundry bookings is bleak. Some orders for hand grenades have gone to pipe foundries, but these are small.

Falling off of commercial business has intensified price competition. With foundry labor costs due for another rise shortly sinking casting prices are tightening the squeeze on foundry profits.

Supply of foundry materials continues to improve. Coke is plentiful. Pig iron is still tight but deliveries are more regular and supplies are expected to loosen as more production of western blast furnaces is made available to foundries. Columbia Steel Co. and Geneva Steel Co. are both allocating pig iron to foundries. The slowdown of pipe foundries, with consequent lessening of their scrap requirements, has made more scrap available elsewhere.

CUTBACK in automobile production is affecting foundry operations adversely throughout a wide area. It is estimated that the light production foundries whose interest is primarily in automotive work have reduced their melt by an average 30 per cent. Although many of these adhere to a five-day week, some have lopped a day off their schedules and a few are working only three days a week. For some of the big automotive specialists the cuts are even deeper, going above 40 per cent in some cases.

This has had far-reaching effect on foundry materials suppliers and on the volume of new orders received by foundry equipment manufacturers. Most of the pressure has been taken off pig iron suppliers. Only scattered foundries seek more iron than is presently allocated to them. Most have now established a pig-to-scrap ratio that is best suited to their practice and are satisfied with delivery schedules of both materials. Coke is in even freer supply, with offerings of some of the sellers' going begging in this area.

Because of the reduction in melt, inventories must be correspondingly reduced by foundries to comply with government regulations. Result is that some foundries who are optimistic about a pick-up in defense orders can not now stock up and believe that the shortage problems will be amplified as soon as their melt shows improvement.

Display Cast Parts

A number of cast parts were displayed at the Prime Contractors Exhibit early last month as requiring sources of supply. Packard Motor Car Co., for example, showed a large marine diesel engine block, and Hudson Motor Car Co. was looking for producers of a wide variety of small aluminum alloy castings for its aircraft projects. Officials of the Detroit Arsenal earlier had told a group of foundrymen at the Michigan Regional Foundry Conference that they are again running up against a bottleneck in small armor steel castings. By "small," they said they mean 50-100 pounds. One of the jobs Ordnance procurement men are trying to do is convince steel founders that these castings are not too hard to make. They indicated that one of the shortcomings of many small foundries is inability to maintain close dimensional control, and suggested that additional control equipment would be a good investment. It was intimated that some tank parts which can be cast may have to be specified as forged "because of lack of foundry capacity or interest."

Ten-day-long strike of AFL pattern makers came to an end after the pattern shop operators agreed to a 15-cent-an-hour general pay raise, six paid holidays, inclusion of the worker's dependents in the company-paid medical-surgical insurance program, and 30 days' retroactivity. These contract terms have been submitted to Wage Stabilization Board for approval, the provisions to go into effect as of 30 days prior to date of such approval. One of the union's demands had been for establishment of a pension fund, which the companies refused.

Ford Motor Co., reporting on progress in its steel mill expansion and improvement program, says that part of its 205,000-ton yearly increase in coke capacity which will come in next June will be used to supply its new foundry facilities. The company is building a production foundry in Cleveland to serve its new engine plant, is constructing a specialty foundry at the Rouge and is expanding its Dearborn Iron Foundry. It is understood that the new specialty foundry may be entirely devoted to the shell molding process.

WHILE light gray iron casting work continues to lag, with early deliveries available, district foundries report a further stepping up in requirements for heavy castings. In fact, Washington now regards the heavier gray iron castings, 3000 pounds and over, as among the more critical casting items. Primary demand for the heavier work in this district is from machine tool builders. Some shops here have backlogs of three to four months on machine tool castings.

Reflecting this general situation, some gray iron shops engaged in both light and heavy work, are working six days a week on the latter and only four days on the former. Metallics are in fair supply. While tightening, cast scrap appears adequate; and there is less pressure for pig iron. Some gray iron shops have a full 30-day inventory on hand, the limit imposed by the government.

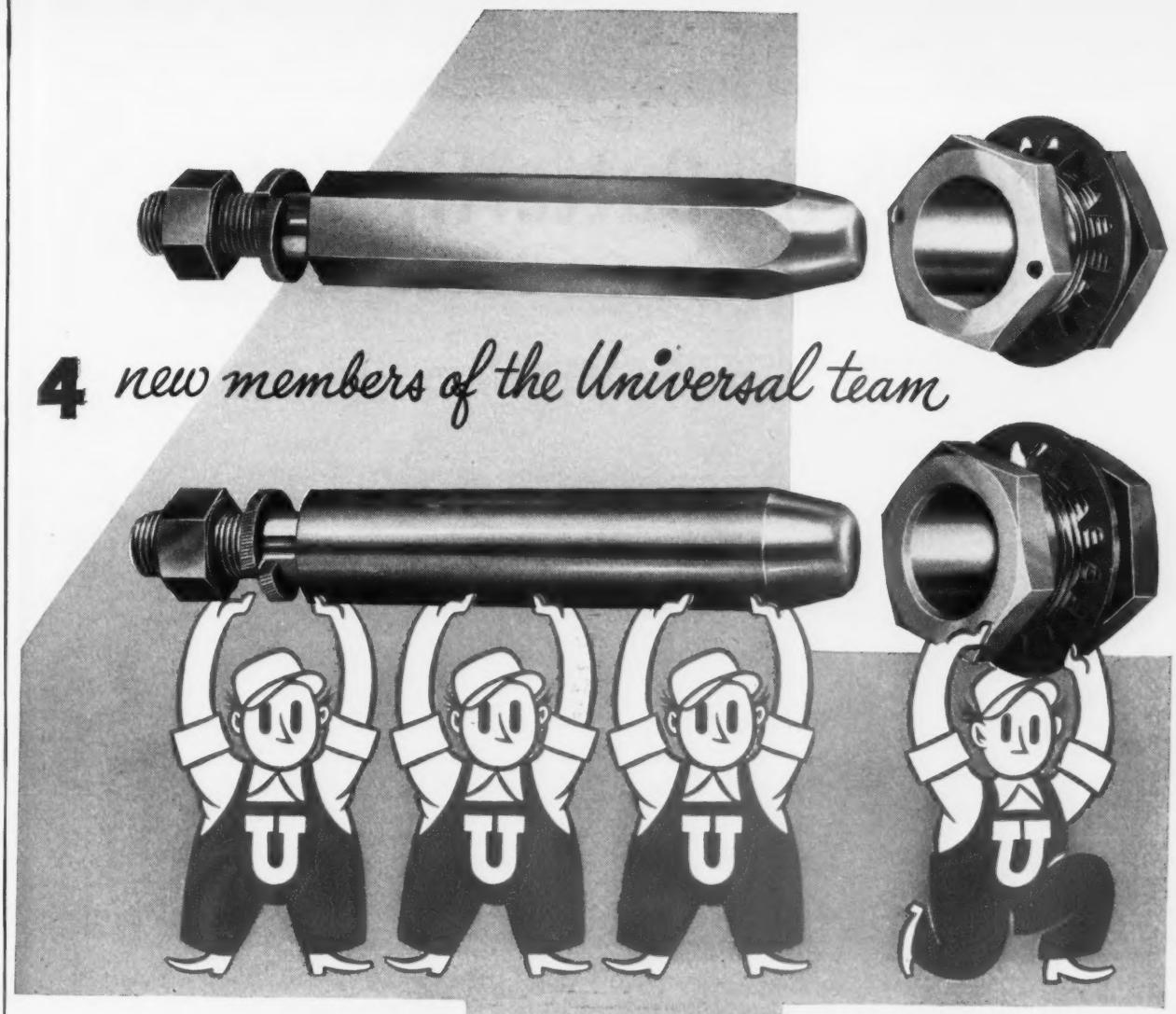
Steel and malleable shops have substantial backlogs. Apart from some orders for shell components, direct munitions work is still light but there is sufficient work in pumps and compressors and motor trucks, to mention a few lines, to expand backlogs at most plants. Scrap requirements of these shops are tight, especially malleable scrap; and these consumers generally are taking all the pig iron they can get as few, if any, are able to build up an inventory of even 30 days.

Operations at brass and bronze foundries are restricted by difficulty in getting raw material. Some are working five days a week, and others have been forced to cut back to four days.

The labor situation is reasonably serene as negotiations get under way at various plants on renewal of contracts for next year.

Foundry Names Officers

Officers have been announced for Depew Foundry Corp., recently opened at 629 Ellicott Rd., Depew, N. Y. Warren L. Pell is president-treasurer, Harriet G. Pell, vice president and Claude J. Bryndle, secretary. Foundry produces brass, bronze and aluminum castings.



threaded flask pins and bushings now added to the UNIVERSAL quality line

To an already famous team of foundry equipment, Universal has now added a threaded series of Flask Pins and Bushings that will save you precious minutes by assuring instant and accurate alignment of cope and drag. Like other members of this famous team, they'll also save the cost and downtime that replacement always requires because they're heat-treated and precision ground from high quality steel to stand up under rough treatment. Universal threaded series Flask Pins and Bushings are used in steel, aluminum, magnesium or other light metal flasks. Bushings are available in both the round and elongated types; pins in both round and hexagonal types. Universal carries a complete line of sizes of its threaded series as well as its taper and plain series Pins and Bushings as regular stock items. Direct your inquiries and orders to the office nearest you . . . 1060 Broad Street, Newark, N. J., 5035 Sixth Ave., Kenosha, Wisc., or the home office.

150

UNIVERSAL ENGINEERING COMPANY, FRANKENMUTH 4, MICHIGAN

50,000-lb. Butterfly Valve

CAST IN TRULINE®-BONDED CORE

This giant casting provides further proof that Hercules Truline Binder is used wherever metal is cast. The core in this case was baked to perfection overnight with the addition of just slightly more than 1% of Truline by weight of the total mix.

Truline Binder helps cut costs and saves time because it:—

1. Replaces core oils and pitch to advantage.
2. Is unexcelled when used with reclaimed sand and crude sand.
3. Cuts baking time.
4. Saves time in the cleaning room.
5. Is readily available.
6. Costs less than many other binders and is more efficient.

If you want your castings to come out sounder . . . truer . . . cleaner . . . write to Hercules for technical data and a generous testing sample of Truline Binder.

NF51-6

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2,000 lbs. Sand 53 A.F.A.

400 lbs. Silica Flour

100 lbs. Fire Clay

50 lbs. Bentonite

30 lbs. Truline

7-8% Moisture

HERCULES POWDER COMPANY INCORPORATED Naval Stores Dept., 920 King St., Wilmington, Del.

FOUNDRY EQUIPMENT MANUFACTURERS

Discuss Defense Production Needs

By FRANK G. STEINEBACH
Editor
FOUNDRY

PROBLEMS connected with the production of foundry equipment to meet the needs of an expanding defense effort featured discussion at the 33rd annual meeting of the Foundry Equipment Manufacturers' Association, held at the Homestead, Hot Springs, Va., Oct. 31 to Nov. 2. The meeting drew the largest attendance in the organization's history.

In opening the first session, C. V. Nass, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, and president of the association, discussed the confusion created by actions of government. He pointed out that wages are rising, taxes are up, government spending is up, and industrial profits are down. The future appears confused, but it seems apparent that spending will be high during the coming year because of the national election. Foundry equipment backlogs are good, and business is good. Problems concern materials, manpower and costs.

Higher costs of industry can be met only by greater productivity, according to Mr. Nass. This greater productivity should come from manpower, but this probably cannot be accomplished. Therefore, machinery must be relied upon. In the foundry industry, Mr. Nass sees a trend toward greater mechanization. In conclusion, he urged members of the association to keep in closer touch with their congressmen and senators so that these representatives in Washington will be familiar with the industry and its problems as related to government.

In a symposium on the Washington picture, Thomas Kaveny Jr., Herman Pneumatic Machine Co., Pittsburgh, and foundry consultant to the Foundry Equipment & Supplies Section, National Production Authority, outlined some of the difficulties in securing a satisfactory allocation of materials under CMP for producers of foundry equipment. Mr. Kaveny also reported on the recent meeting of the Foundry Industry Advisory Committee to the NPA.

Leslie J. Carson, chief of the Machinery Branch of the Industrial Materials and Manufactured Goods Division of the Office of Price Stabilization, explained the various phases of equipment price control under CPR 30. Mr. Carson stated that industry advisory committees are being appointed for a number of industries, including foundry equipment.

Walter L. Seelbach, Superior Foundry Inc., Cleveland, and president of AFS, told of his visit to the International Foundry Congress in Belgium in September, and stated many visitors from Eritain and the Continent are expected for the International Foundry Congress and Show to be held in Atlantic City, N. J., May 1 to 7, 1952. Mr. Seelbach described the various features of the convention and the exhibition of foundry equipment and supplies to be staged on one floor in the convention hall.

An interesting and instructive interpretation of FEMA business trend charts was presented by E. A. Borch, National Metal Abrasives Co., Cleveland, and chairman of the Statistical Committee. A year ago Mr. Borch's interpretation indicated the need for greater emphasis on production, and this prediction has been borne out during the ensuing period. The present study of association data shows that while production continues to be important, the industry now should give greater consideration to increased sales and promotion effort.

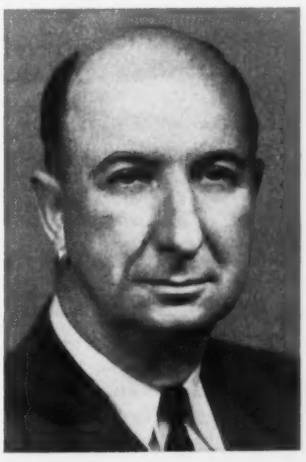
Claude B. Schneible, Claude B. Schneible Co., Detroit, and chairman of the Foundry Educational Foundation, discussed briefly the work of that organization, and then introduced George K. Dreher, executive director, who gave an interesting picture of the exceptional accomplishments of that organization the last few years. Mr. Schneible closed the discussion by explaining the new plan for perpetuating the work of FEF through a regular industry membership structure.

Aubrey J. Grindle, Foundry Services & Equipment Corp., Harvey, Ill., and vice president of FEMA, reported on recent activities of the National Castings Council. Mr. Grindle, a consultant to the Foundry Equipment and Supplies Section, NPA, also outlined some of the problems of that section.

Arthur J. Tuscany, executive secretary of FEMA, presented a thought-provoking discussion of what will be the needs of the equipment industry after the present emergency clears. He pointed to the present trend in the foundry industry where the larger foundries are growing and many of the smaller shops are finding it difficult to stay in business. He indicated that equipment manufacturers should review their engineering and design to be sure that equipment for new methods and new processes is developed in advance of industry's needs. Efforts must be made to produce the types of equipment which foundrymen feel are necessary. Mr. Tuscany also stressed the point that the industry must pay greater attention to distribution. Real selling has not been required for a number of years, but in the new era which lies ahead, selling will be most important. Now is the time to go about organizing an adequate sales organization.

Speaking on "What About Tomorrow," Earl L. Shaner, editor-in-chief, *Steel*, told of the problems that exist around the world, and then discussed the following three problems which

C. V. NASS
President



AUBREY J. GRINDLE
Vice President

we must solve if we are to have the peace we so earnestly desire: Resolving the feud between Russia and the free nations; raising the social and economic status of millions of underprivileged peoples of the world; finding a way to control inflation. In selling our way of life to others, Mr. Shaner suggested that we use the name "Competitive System," to describe our American free enterprise system. This great American co-operative system is the greatest hope for world peace today. In looking toward the future, Mr. Shaner suggested that industry will need better salesmanship, more market research and greater effort in market development.

These FEMA officers were re-elected: President, Chester V. Nass; vice president, Aubrey J. Grindle; executive secretary-treasurer, Arthur J. Tuscany. The following were elected new directors: David E. Davidson, Link-Belt Co., Chicago, and W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh. Chester V. Nass was re-elected to the board.

California Pipe Plant Begins Operations

California plant of United States Pipe & Foundry Co., located at Decoto in Alameda county, began operations early in November producing cast iron pressure pipe. Designed by the company's engineering department and constructed by the Austin Co., the main building and its appurtenances include these facilities for manufacturing centrifugally cast iron pipe: Storage for pig iron, coke and limestone; two hot-blast cupolas; three centrifugal pipe casting machines; a pipe annealing oven; two core blowing machines and a core oven.

Other facilities include a hydrostatic test press, drilling machine for mechanical joint pipe, spinners for lining and a tunnel for curing cement-lined pipe, a pipe painting machine, pipe storage skids and handling equipment for rail or truck shipment. A chemical laboratory and a physical testing laboratory provide the means of checking and controlling the quality of the pipe. A one-story building houses the plant offices and provides wash and locker facilities for plant personnel, which numbers approximately 125.

Resident manager of this operation is Clifford R. Tinsley, formerly resident manager of the Burlington, N. J. plant.

Kaiser Expands Primary Aluminum Capacity

Kaiser Aluminum & Chemical Corp., Oakland, Calif., plans to double its aluminum reduction plant and power facilities now under construction in the New Orleans area. Capacity of the new plant will be increased to 200,000 tons of primary aluminum a year. Four aluminum reduction potlines, with a total annual capacity of 100,000 tons, are to be added to four similar potlines now nearing completion.

The first aluminum is due to be poured at the New Orleans plant in December.

INTERNATIONAL FOUNDRY CONGRESS

To Attract World-wide Attendance

WITH release of exhibit floor plans and the tentative program of special events for the AFS International Foundry Congress and Show, preparations for the 1952 meeting in Atlantic City, May 1-7, are moving rapidly.

Presiding officers of the congress will be Walter L. Seelbach, president, Superior Foundry Inc., Cleveland, as president of the American Foundrymen's Society, and Guido Vanzetti, president, Milan Steel Foundry Co., Milan, Italy, as president of the International committee. C. V. Nass, Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago, will be general chairman of convention committees as president of the National Castings Council.

The International Committee of Foundry Technical Associations, representing the United States, England, France, Belgium, the Netherlands, Italy, Sweden, Switzerland, Spain, Denmark, Norway and India, schedules the holding of International Foundry Congresses. The United States is on the schedule every sixth year, and the 1952 meeting will be the first unrestricted event of its kind in this country since 1926. Indications are that 300 to 400 international visitors will attend the congress, and a two-week pre-congress study tour of major foundry centers is being arranged for them.

The congress will run seven full days, from Thursday, May 1, through Wednesday, May 7. Each day will be specially designated and some special appropriate activity will be scheduled. Thus, May 1 is Defense Day, with participation of the armed services; May 2 is "Chapter Day," highlighted by a chapter officers' and directors' dinner. On May 3, "President's Day," will be the annual business meeting and banquet. Sunday, May 4, "International Day," features the international reception for guests from abroad.

May 5 is "Management Day," with sessions for management. "Old Timers' Day," May 6, will feature a molding contest for old timers in the industry. And Wednesday, May 7, is "Exhibitors' Day."

All technical meetings and exhibits will be held in the huge Convention Hall, with an exhibit of 90,000 square feet on one floor. Exhibits will be open all seven days. Technical meetings will be scheduled six days only, with committee meetings only on Sunday, May 4. On Friday and Tuesday, charter buses will be made available for visits to nearby foundries, and individual trips can be made on the other five days.

A full program of entertainment for the ladies is being planned with a special ladies entertainment committee. The wives of all past-presidents of the society will be recognized as honorary hostesses in keeping with the international character of the event.

Three reasons governed the selection of Atlantic City as the site for this important International Foundry Congress and Show: Excellent exhibit facilities on one floor; suitable meeting rooms in Convention Hall; and a guarantee of hotel rooms adequate to house the expected attendance of 15,000 or more foundrymen at this 56th annual meeting of the American Foundrymen's Society.

Molding Machines

New Bulletin describes SPO line of Jolt Pin Lifters

Complete data on the Series 3000 high-production jolt pin lifters are presented in this new illustrated catalog which is available to foundry management and purchasing personnel such as superintendents, foremen, production expediters, etc. Designed for maximum speed, safety and ease of operation, these machines feature the patented SPO "inverted jolt" mechanism.

The jolt pin lifters described in this publication have jolt capacities ranging from 750 to 4000 pounds and are fully adjustable to meet diversified production demands. Pivot type adjustable lifting pins will accommodate any type or size of flask within their capacities. Both breakaway and secondary draw speeds can be adjusted to different job requirements, and jolt impact intensity of each machine is variable.

In this catalog, dimensions, capacities, pattern draw, SPO vibrator size and other pertinent data are tabulated for quick reference. Photographs and line drawings depict the construction and features of the various machines.

Bulletin No. 30 will be sent upon receipt of coupon or letterhead request.

129-81

SPO INCORPORATED

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SPO, Incorporated

Please send (without obligation) your new illustrated Bulletin No. 30.

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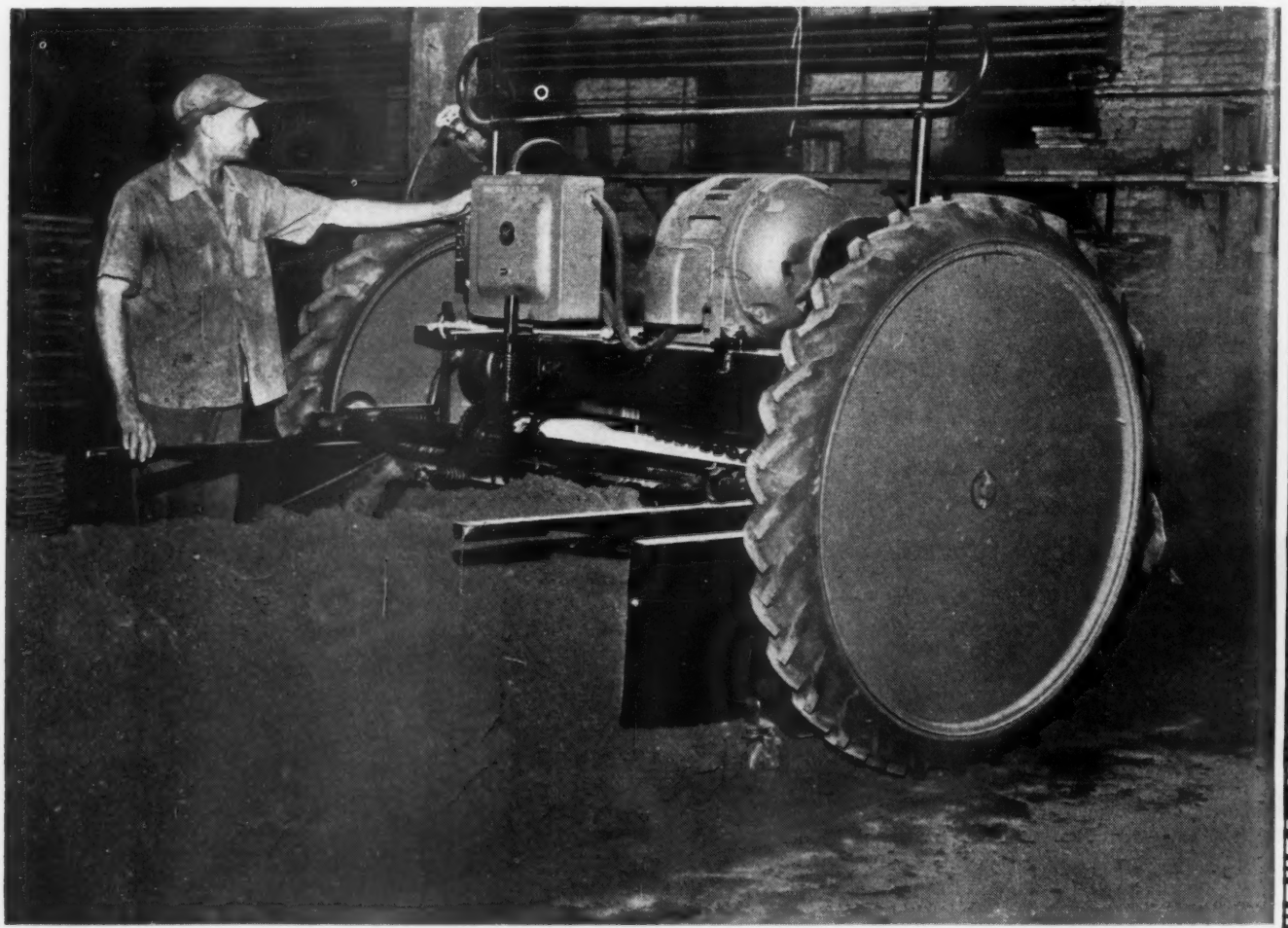
The New Moulders' Friend
FINDS FRIENDS EVERYWHERE



MOULDERS like The New Moulders' Friend sand conditioner, because the blending action of the rotary wire brush thoroughly mixes and aerates the sand, making it easier for them to put up more and better molds.

NIGHT CREWS like it, because it eliminates much manual labor and does a better job of conditioning the sand. With this completely self-propelled machine one man can condition more than two tons of sand per minute.

SAND CONTROL MEN like it, because it does such a thorough job of mixing, moistening and screening that they really can control the sand.

MAINTENANCE MEN like it, because it has few moving parts to keep in order.

YOU will like The New Moulders' Friend, because it pays for itself with better castings and labor saved.

Investigate The Moulders' Friend today. See one in operation.

"The Moulders' Friend" **Dallas City, Illinois**

Sand Conditioning Equipment

STANDARD SPECIFICATIONS FOR FERROSILICON

ASTM Designation: A 100—50

Adopted, 1927; Revised, 1939, 1950.

Scope

1. These specifications cover seven grades of ferrosilicon designated A, B, C, D, E, F, and G.

Basis of Purchase

2. (a) The ferrosilicon shall be furnished in lumps, or crushed or screened to size as specified.

(b) When furnished in lump or granulated form, the ferrosilicon shall be free from excessive disintegration.

(c) The reported percentage of silicon obtained by chemical analysis shall be used to determine the billing of the material to the purchaser.

Chemical Composition

3. (a) The material shall conform to the requirements as to chemical composition prescribed in Table I.

(b) The manufacturer shall furnish an analysis of each shipment showing the silicon content and, when required, such of the other elements specified in Paragraph (a).

Packing

4. Ferrosilicon shall be packed in sound containers, or shipped in bulk, in such manner that none of the metal is lost in shipment.

[1] 1949 Book of ASTM Standard, Part 1.
[2] 1950 Book of ASTM Methods of Chemical Analysis of Metals.

Inspection

5. (a) The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the sampling, packing, and shipping of material ordered. The manufacturer shall afford the inspector all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with these specifications.

(b) If the purchaser so elects, the material may be sampled by him at the destination, in which case at least 10 per cent of the shipment shall be sampled.

Rejection

6. Any claims or rejections based on check analysis shall be made to the manufacturer within 30 days from receipt of material by the purchaser.

Sampling

7. The material shall be sampled in accordance with the Standard Methods of Sampling Ferro-Alloys (ASTM Designation E 32).[2]

Chemical Analysis

8. The chemical analysis of the material shall be made in accordance with the procedure for ferrosilicon as described in the Standard Methods of Chemical Analysis of Ferro-Alloys (ASTM Designation: E 31).[2]

Table I—Chemical Requirements[a]

	Grade A	Grade B	Grade C	Grade D	Grade E	Grade F	Grade G
Silicon, per cent[b]	90.0 to 95.0	80.0 to 90.0	72.0 to 79.0	47.0 to 52.0	25.0 to 30.0	14.0 to 18.0	8.0 to 14.0
Carbon, max. per cent	0.15	0.15	0.15	0.15	0.50	1.5	1.5
Sulphur, max. per cent	0.04	0.04	0.04	0.04	0.04	0.06	0.06
Phosphorus, max. per cent	0.05	0.05	0.05	0.05	0.06	0.15	0.15

[a] For purposes of determining conformance with these specifications, the reported analysis shall be rounded off to the nearest unit in the last right-hand place of figures used in expressing the limiting value in accordance with the rounding off method of the Recommended Practices for Designating Significant Places in Specified Limiting Values (ASTM Designation: E 29)[1].

[b] For purposes of determining the silicon content of any shipment, silicon shall be reported to the nearest 0.01 per cent, applying the same rounding-off procedure as prescribed in Footnote [a].

STANDARD SPECIFICATIONS FOR FERROMANGANESE

ASTM Designation: A 99—50

Adopted, 1927; Revised, 1939, 1950.

Scope

1. These specifications cover six grades of ferromanganese, designated:

Standard ferromanganese	Grade A
Medium-carbon ferromanganese	Grade B, Grade C
Low-carbon ferromanganese	Grade A, Grade B

Basis of Purchase

2. (a) Ferromanganese shall be furnished in pigs, or lumps, or crushed or screened to size, as specified.

(b) The reported percentage of manganese as obtained by chemical analysis shall be used to determine the billing of the material to the purchaser.

Chemical Composition

3. (a) The material shall conform to the requirements as to chemical composition prescribed in Table I.

(b) The manufacturer shall furnish an analysis of each shipment showing the manganese content and, when required, such of the other elements specified in Paragraph (a).

[1] 1949 Book of ASTM Standard, Part 1.
[2] 1950 Book of ASTM Methods of Chemical Analysis of Metals.

Packing

4. Ferromanganese shall be packed in sound containers, or shipped in bulk, in such manner that none of the metal is lost in shipment.

Inspection

5. (a) The inspector representing the purchaser will have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the sampling, packing and shipping of material ordered. The manufacturer shall afford the inspector all reasonable facilities, without charge, to satisfy him that the material is being furnished in accordance with these specifications.

(b) If the purchaser so elects, the material may be sampled by him at the destination, in which case at least 10 per cent of the shipment shall be sampled.

Rejection

6. Any claims or rejections based on check analysis shall be made to the manufacturer within 30 days from receipt of material by the purchaser.

Sampling

7 The material shall be sampled in accordance with the Standard Methods of Sampling Ferro-Alloys (ASTM Designation: E 32).[2]

Chemical Analysis

8. The chemical analysis of the material shall be made in accordance with the procedure for ferromanganese as described in the Standard Methods of Chemical Analysis of Ferro-Alloys (ASTM Designation E 31).[2]

Table I—Chemical Requirements[a]

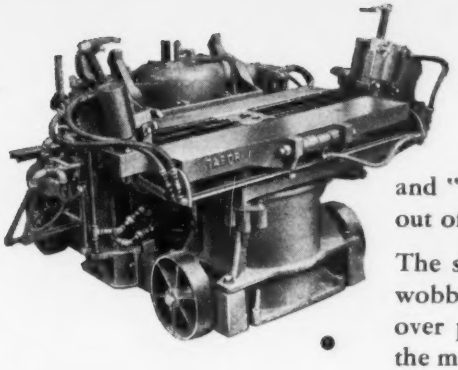
	Standard Ferromanganese	Medium Carbon Ferromanganese			Low Carbon Ferromanganese	
		Grade A	Grade B	Grade C	Grade A	Grade B
Manganese, per cent[b]	78.0 to 82.0	80.0 to 85.0	80.0 to 85.0	80.0 to 85.0	80.0 to 85.0	80.0 to 85.0
Carbon, max, per cent	7.5	as specified[c]	as specified[c]	as specified[c]	as specified[d]	0.75
Phosphorus, max, per cent	0.35	0.35	0.35	0.35	0.35	0.35
Sulphur, max, per cent	0.05	0.05	0.05	0.05	0.05	0.05
Silicon, max, per cent	1.2	1.2	1.5	2.5	1.2	7.0

[a] For purposes of determining conformance with these specifications, the reported analysis shall be rounded off to the nearest unit in the right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of the Recommended Practices for Designating Significant Places in Specified Limiting Values (ASTM Designation: E 29)[1].

[b] For purposes of determining the manganese content of any shipment, manganese shall be reported to the nearest 0.01 per cent, applying the same rounding-off procedure as prescribed in Footnote [a].

[c] Medium-carbon material may be obtained with the following maximum percentages of carbon: 3.0, 2.0, 1.5 and 1.0.

[d] Grade A low-carbon material may be obtained with the following maximum percentages of carbon: 0.75, 0.50, 0.30, 0.15, and 0.10.



do you have upper-plate wobble?

If "upper-plate wobble" is distracting with dentures, it's downright fatal with rollover plates. You wind up with weakened jarring blows, unequal ramming, and "secondary jolts" that quickly get plate and jar head out of whack. Net result—bad molds and excessive wear.

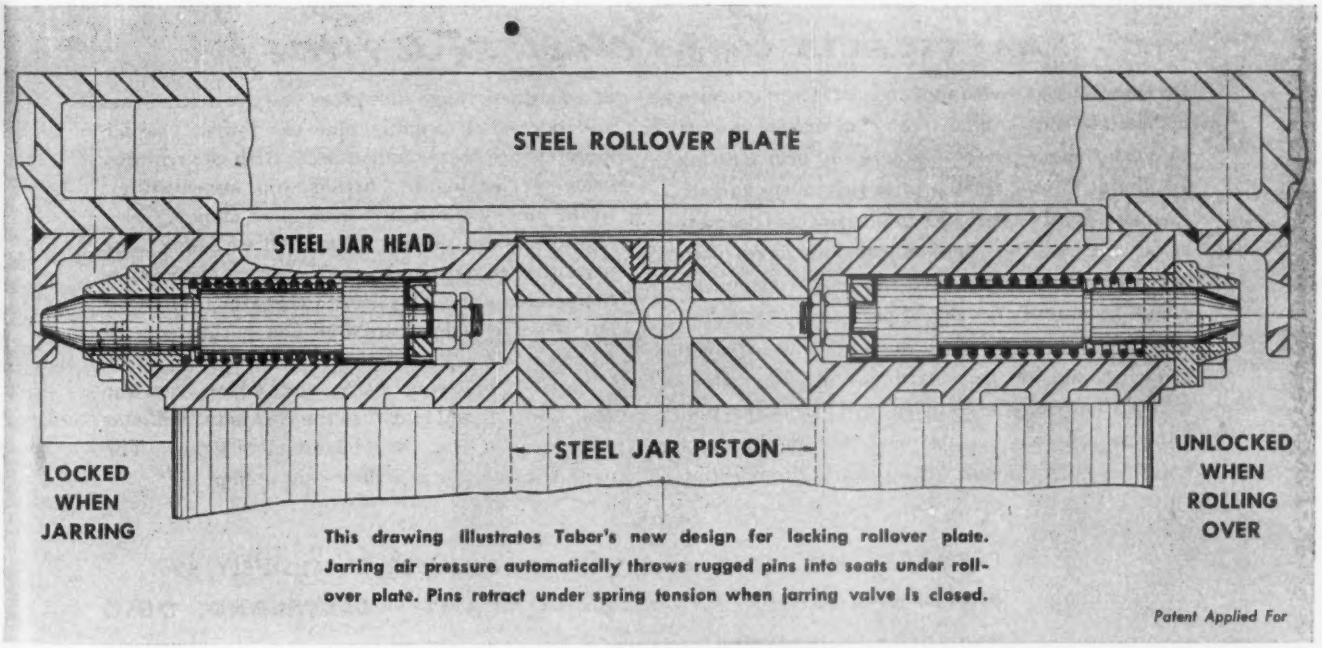
The sketch below shows our engineers' answer to plate wobble on Tabor Rollovers. This construction locks rollover plate and jarring mechanism *into one rigid assembly* the moment jarring air is introduced—a new feature never before offered in jar, power rollover, power draw machines.

Now you get four *new* advantages in Tabor Rollovers:

1. Effectiveness of jarring blow is increased at least 25%.
2. Ramming effect is equalized *all over the mold.*
3. No "secondary jolt" between plate and jar head—adds greatly to life of both members.
4. Does away with all plate wobble, even when handling a mold with uneven weight distribution.

Always big producers, Tabor Rollovers also feature the new quick-change-over table which permits *independent* setting of all four clamps—invaluable in core room or jobbing shop where pattern changes are frequent.

Bulletin #514 gives full details. Write, wire, or 'phone today.



This drawing illustrates Tabor's new design for locking rollover plate. Jarring air pressure automatically throws rugged pins into seats under rollover plate. Pins retract under spring tension when jarring valve is closed.

Patent Applied For

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H. Reich, Trussville, Ala.

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Makes sense, doesn't it? And all we ask is to be permitted to determine what your exact hardness requirements are. This doesn't cost you anything—but if we're right—can save you a tidy sum of money.

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MICHIGAN REGIONAL CONFERENCE

Considers Quality Control

By EDWIN BREMER
Metallurgical Editor
FOUNDRY

NEARLY 200 attended the annual Michigan Regional Foundry Conference at Michigan State College, East Lansing, Mich., Oct. 11-12. Meeting was sponsored by the Detroit, Saginaw Valley, Central Michigan and Western Michigan Chapters of the American Foundrymen's Society, and the Mechanical Engineering Department of Michigan State College.

Topics discussed at the conference included strategic materials and the foundry, molding methods, sand problems, and quality control. At the dinner Thursday evening, Walter Seelbach, president of AFS, gave a brief resume of the society's activities, and some impressions gained on his recent European trip. Prof. E. C. Prophet, Department of Geology and Geography, Michigan State College, presented an interesting talk on how war conditions affect obtaining supplies of such strategic metals as tungsten, chromium, manganese, tin, etc., from abroad.

At the close of the two-day session, officers of the several Michigan chapters sponsoring the conference met and decided to hold the 1952 conference at University of Michigan, Ann Arbor. Future arrangement will be odd-year conferences at East Lasing, and even-year conferences at Ann Arbor.

At the opening session Thursday morning Dean Loren G. Miller, School of Engineering, commented on the shortage of engineers and the advisability of up-grading young men in industry as soon as possible as a means of stimulating interest in their work. Prof. Leonard G. Price, Department of Mechanical Engineering, pointed out that conferences are valuable to educators, students, and participants due to insight gained in each others' problems.

A technical session related to strategic materials and the foundry had Fred J. Walls, International Nickel Co., Detroit, as chairman. Prescott L. Goud, Detroit Tank Arsenal, Detroit, mentioned difficulty in obtaining tank castings. He pointed out that many small foundries could participate in such production if they would purchase the necessary equipment for determining physical properties. He said there is a tremendous demand for small armor castings, but apparently the required ballistics test scares off prospective producers. However, with sufficient alloys and proper heat treatment, such tests are met without difficulty. He also mentioned the intense activities of the Army Ordnance Department which have resulted in suitable armor using only 2 per cent alloys as compared to a previous 9 per cent; it employs the manganese-molybdenum combination without nickel even in heavy sections.

Capt. Joseph E. Black, Detroit Tank Arsenal, discussed problems involved in qualifying armor castings, and dealt with nonballistic tests such as x-ray, Charpy, brinell hardness, etc. He said that since brinell hardness is not in direct relation to ballistic tests, a range of suitable hardness values is set up based on the thickness of the plate or casting. Best results on armor are obtained with a 100 per cent martensitic structure produced by fully quenching and tempering castings. Highest Charpy values at minus 40° F are obtained with that condition. Subnormal temperature Charpy values are used since they follow closely the ballistic tests at normal temperature and high velocity. Final discussion at the session was on the foundry industry and Washington by Harry K. Herschmann, National Production Authority, Washington, who described procedures for obtaining various supplies.

Afternoon session had as chairman David Boyd, Engineering Castings Co., Marshall, Mich., and the topic considered was various molding mediums such as sand, permanent molds, and shell molds. Bruno Darin, Ford Motor Co., Dearborn, Mich., pointed out that, with proper control, sand can be used to produce a wide variety of castings. While some knowledge is available on sand properties in relation to metals, there still is a wide field for research on such phases as mold breakdown, interfacial conditions, mold atmosphere and pressures.

Howard McClelland, Eaton Mfg. Co., Foundry Division, Vassar, Mich., described the permanent mold process employed by his firm for gray iron castings. Both castings and molds are made of iron containing 2.45 to 2.65 per cent Si and 3.45 to 3.65 per cent TC. All castings are annealed to bring the brinnell hardness within 170 to 207 and to provide a microstructure of ferrite and fine graphite which insures good machining as well as desired physical properties. Castings produced weigh from a few ounces up to 15 lb.

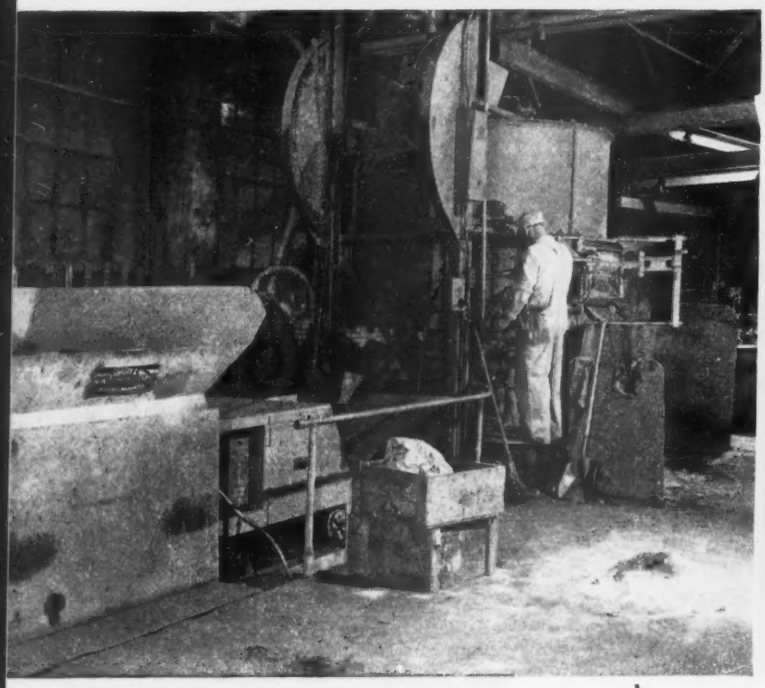
Shell molding was discussed by Richard Herold, Borden Co., New York, who said that, at present, some 14 or 17 foundries now are using the process to some degree, compared with only three a year ago. He stated that numerous improvements have been made in the process which re-

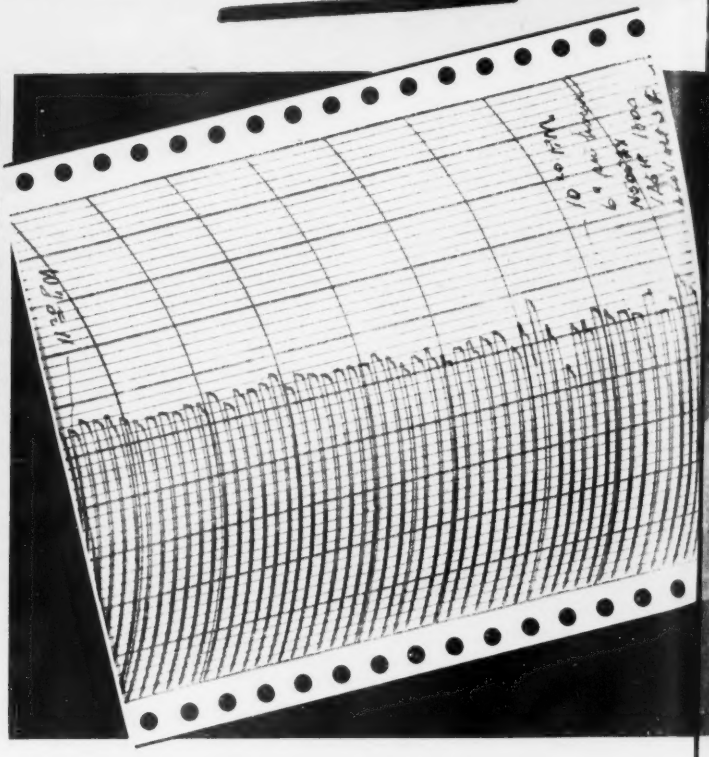
(*Continued on page* 164)

Industry-education get-together (l. to r.): Prof. L. C. Price, Michigan State College; Walter L. Seelbach, Superior Foundry Inc., Cleveland, and president, AFS; Prof. Charles C. Sigerfoos, and Dean L. G. Miller, Michigan State

SINCE 1949

Better Sand at Lowest Cost





1949 was the year that Dalton, Fremont and Hansell Elcock first used B&P Combination Sand Conditioning and Mulling Units (Preparator *plus* Speedmullor). These installations have *proved* themselves in lowering material and labor costs, improved sand quality, higher productivity per molder and improved casting quality. Since 1949, foundries throughout the world have adopted the B&P combination conditioning and mulling method with outstanding success. To name a few:

Atlas Foundry Co.
Central Specialty, Div. of King-Seeley Corp.
Continental Gin Co.
Georgia Iron Works
International Harvester Co. (3 units)
Midwest Foundry Co.
Newnam Foundry Co., Inc.
Noblesville Casting Co.
Peerless Foundry Co.
Peru Foundry Co.

These foundries have obtained all of the advantages of a complete sand system at very moderate cost. You, too, can save with this B&P unit—write today for full information!

AT DALTON FOUNDRY, WARSAW, IND.: Dalton depends on two Speedmullor-Preparator units for complete conditioning and mulling . . . one in their gray iron and one in their malleable foundry. Each unit is operated about three hours each night and each prepares approximately 125 tons of sand during this time. Total cycle time for each batch of synthetic all-purpose molding sand is 72 seconds, and the watt-hour meter record above shows a typical hour's operation on one of the units during which 50 batches were prepared—50 batches totaling 1150 cu. ft.—in one hour.

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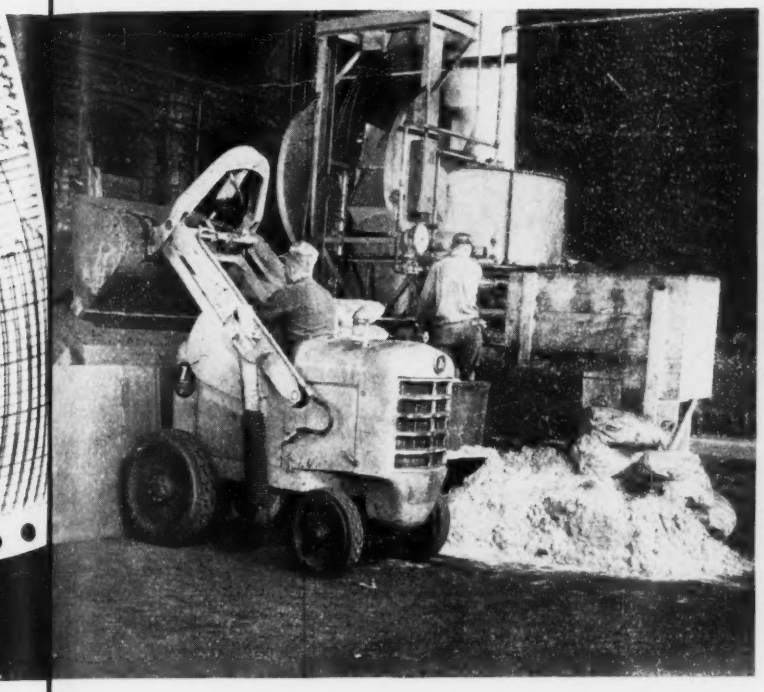
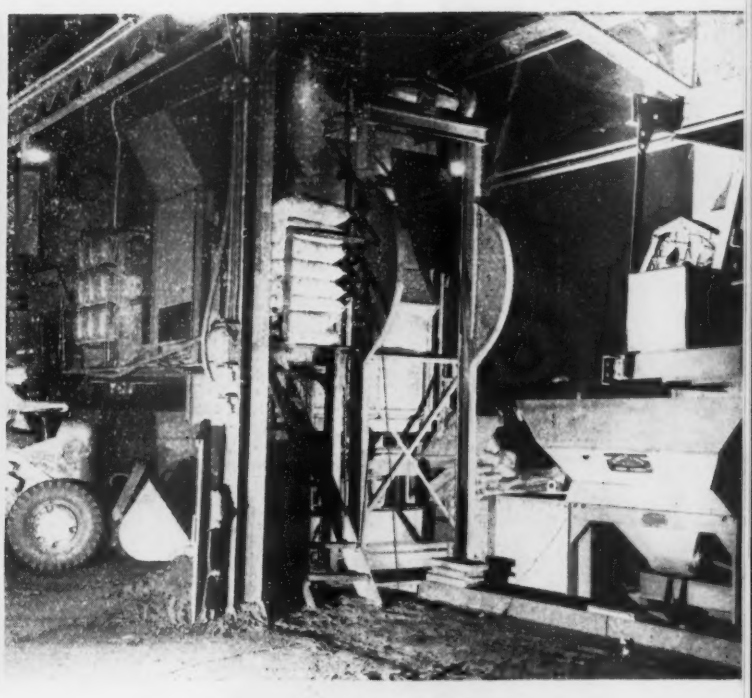
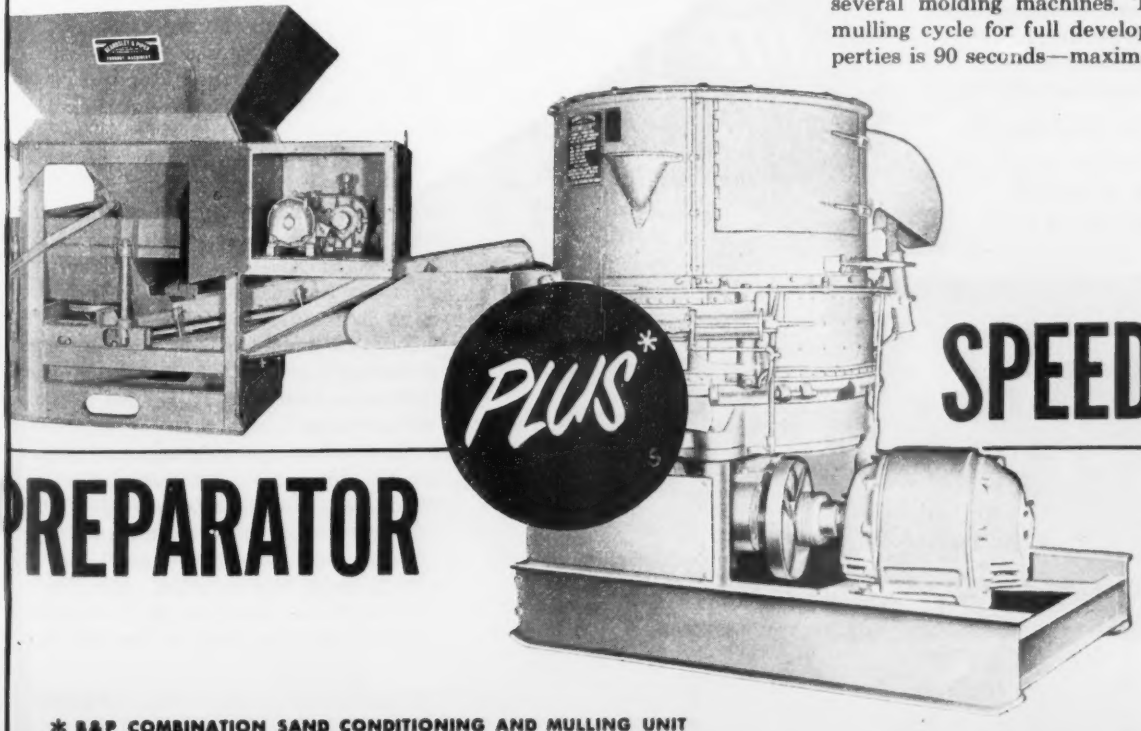
...S WITH B&P COMBINATION UNITS!





AT FREMONT FOUNDRY, FREMONT, OHIO: Two Speedmullor-Preparator units completely condition and mull all of the molding sand used in the foundry. The operation of the first unit was so satisfactory that the second unit was ordered six weeks after the installation of the first. The results: better sand, improved casting quality and reduced material and labor costs.

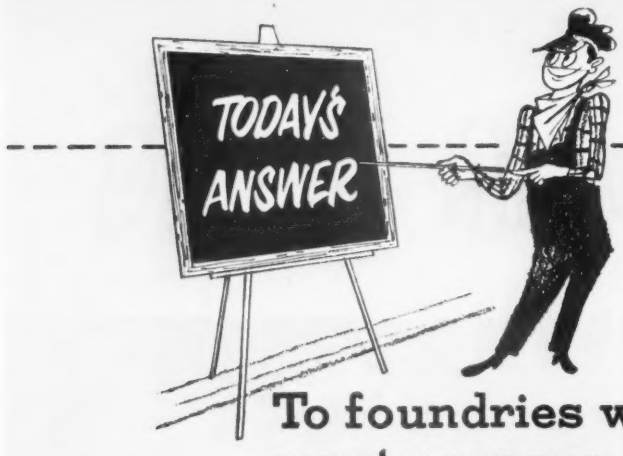
AT HANSELL ELCOCK, CHICAGO: A Speedmullor-Preparator unit completely conditions and mulls the foundry's total requirement of 250 tons of synthetic molding sand each eight hour day. The mullor has two discharge doors . . . prepared sand is discharged through one door into the Motive Speedslinger's spare tank, or through the other door into a pile from which a front end loader carries it to several molding machines. The total conditioning-mulling cycle for full development of physical properties is 90 seconds—maximum.



SPEEDMULLOR

...PREPARATOR

* B&P COMBINATION SAND CONDITIONING AND MULLING UNIT



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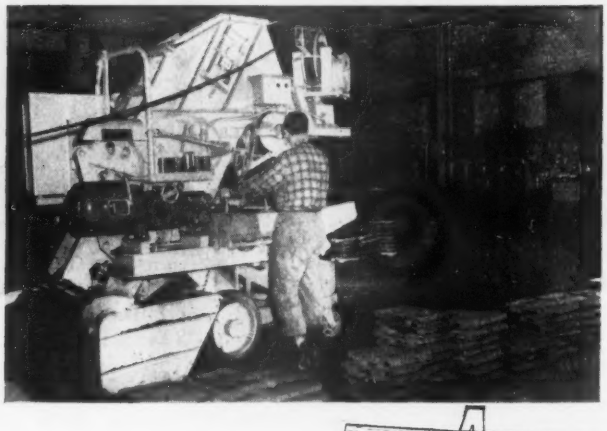
Need greater floor sand cutting capacity and better sand to meet today's demands? Here's *your* answer . . . the Nite-Gang! With it you can get up to 50 tons per hour of fluffy, scrap-free, shot-free, lump-free, thoroughly mixed sand; uniform from top to bottom of the windrow or heap. And important, too, you'll obtain greater production per molder at lower cost!



The Nite-Gang self-propels, self-loads, blends, magnetically separates, breaks lumps, thoroughly screens, double aerates and windrows or piles.

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(*Continued from page* 161)

sults in molds being made in 22 to 25 seconds. One of these includes heating the pattern and shell at 2000° F for a short period to speed polymerization. Since the resin chars at about 572°, the time at 2000 necessarily is brief. New pasting compounds permit the mold to be used in 45 seconds after the mold halves are pasted together. Some molds are being made with a resin content as low as 3½ per cent. Mr. Herold mentioned that in the case of some aluminum castings and light-section castings in other alloys, it is not necessary to back the shell molds with shot or other material, clamping being sufficient.

Friday morning's session on sand problems was presided over by C. W. Hockman, Cadillac Motor Car Division, General Motors Corp., Detroit. Frank S. Brewster, Harry W. Dietert Co., Detroit, pointed out that rat tails, buckles and buckle scabs result from sand expansion in varying degrees, and can be prevented by adding such materials as wood flour, cereal, seacoal, etc., which provide a cushioning effect. Keeping the hot strength of sand in the range 20 to 100 psi at the 1000° F test will give good results. Study of scabbing indicates that such trouble may be minimized by maintaining the green compressive strength over 10 psi, the dry strength under 150 psi, green deformation less than 0.021-in. per in., hot deformation at 1000° F greater than 0.009-in. per in., permeability over 50, and the rammed density below 110 lb per cu ft.

Control Sand Properties

Clyde Sanders, American Colloid Co., Chicago, stated that the most important green sand properties to be controlled in making satisfactory molds include green compression strength, mold hardness, sand density and permeability. These should be determined experimentally for a given foundry since variations in practices do not permit absolute values which are applicable to all. He also said that, in many instances, sand troubles can be eliminated by giving attention to sand temperature. Too often the sand in mechanized units is used too hot; this can be overcome by increasing the amount of sand in the system so that it has a chance to cool before reuse.

In discussing core sands and binders J. D. Johnson, Archer-Daniels-Midland Co., Minneapolis, stressed the importance of using a uniform, dry, graded sand, and weighing all ingredients in a core mixture. The finer the sand used, the more oil binder has to be employed due to the greater

surface area. Likewise when clay content of the sand increases, the amount of oil increases since clay absorbs some of the oil, making it ineffective as a bond. Clay adds green strength, hence the cereal addition should be decreased accordingly.

Most satisfactory procedure for combining the core mixture ingredients is to place them in the mixer in this order—sand, water, additives such as cereal, and then core oil. While water acts as a binder in sand, only enough to provide suitable workability of the sand should be used. Water must be driven off in baking, and the higher the water, the longer the baking time, and the higher the cost of baking. Only enough oil to provide the desired properties in the finished core should be used; this not only cuts costs, but the less materials added to sand (water, oil, cereal), the greater its density and the faster it will bake.

Select Test by Experiment

Friday afternoon's session was devoted to foundry quality control under the direction of Robert E. Schenk, Aluminum Co. of America, Detroit. A. A. Evans, International Harvester Co., Indianapolis, mentioned that variations in bore hardness of cylinder blocks led to the establishment of quality control in his foundry; this required considerable investigation to determine the requirement or test on which to base the control. Bore hardness had to have a 190 minimum number, but it was rather difficult to make such measurement as a routine matter. Study indicated that when the top deck hardness was 196 to 228, bore hardness was satisfactory; so this measurement, easy and rapid to make, was used as the base. Later it was found that when the depth of chill in a wedge bar ranged from 4.5 to 5 (in 1/32-in.) the bore hardness was above the 190 desired minimum, and then the control was established on the wedge bar. After the quality control was established 96.2 per cent of the blocks came within the desired hardness range, compared with 49 per cent without.

Quality control methods were extended to other factors, such as mold hardness of the drag on cylinder blocks to minimize trouble from scabs, blows, etc.; green hardness of barrel cores to eliminate sagging; weighing of various components of the cupola charge, and several others. Mr. Evans pointed out that an important part of control is to select the particular element or test which best reflects the phase or condition to be controlled. Also, control data charts should be placed where those individ-

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COMPLETE SAND SYSTEM
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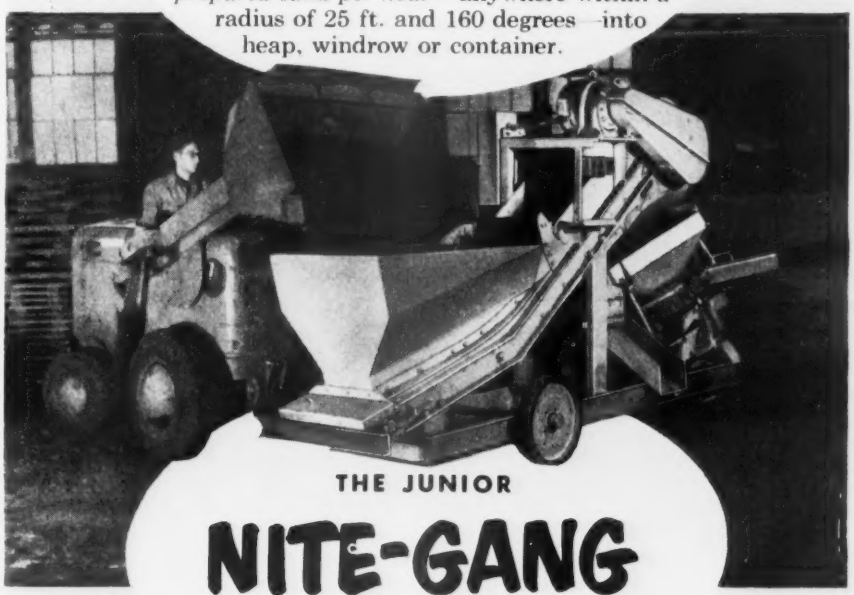
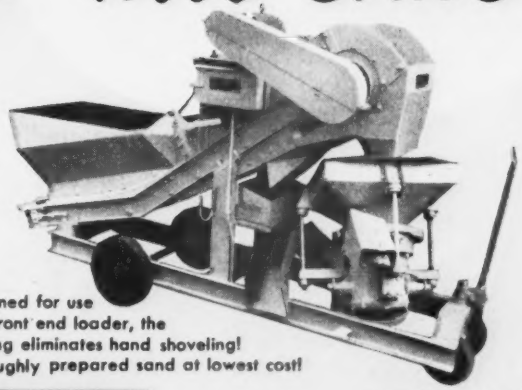


THE JUNIOR
NITE-GANG



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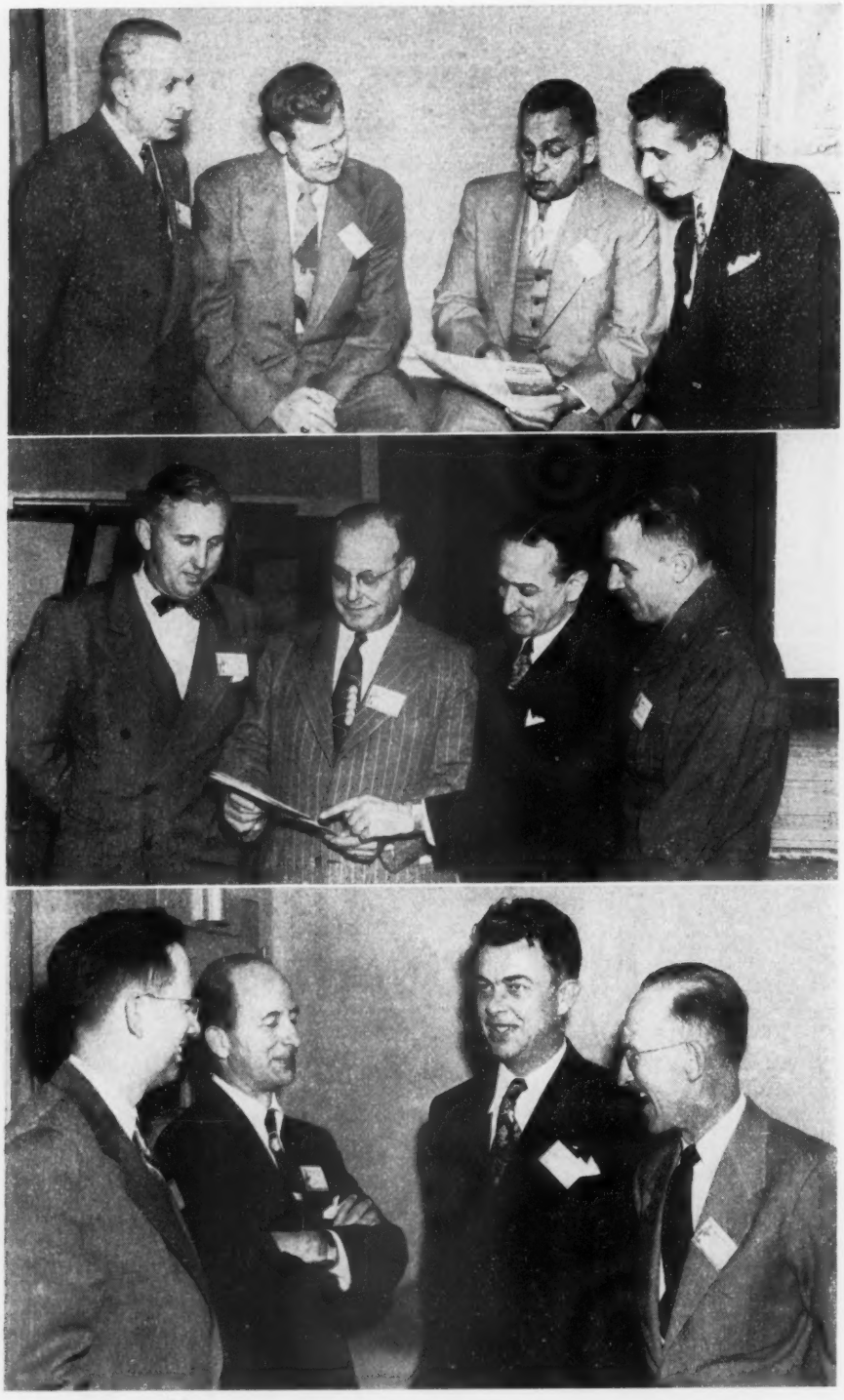
uals responsible for the operations involved can see them and make any adjustments within their province.

Starley Sherwood, Cadillac Motor Car Division, General Motors Corp., Detroit, said the beginning of foundry control at his plant was on a small scale somewhat like described by Mr. Evans, and expanded in a similar manner after its value was proved. In selecting the element or test on which to base the control, he stated the best procedure is to plot values on all details of an operation and choose that which appears to follow most closely the variations in the product. The process then can be investigated and changes made to bring about the most suitable conditions for making satisfactory castings.

Mr. Sherwood pointed out that foundry control can be established in a small foundry as well as a large one, the only difference being in degree or extent. For example, in a small foundry only one or two phases could be selected for control with available employees. One might be to see that the cupola is charged properly, with close attention to type and weight of material. Another might be the use of chill wedge tests to determine suitability of the iron for certain types of castings, etc. Even though such control might appear to be small-scale operation, Mr. Sherwood said, it would have a marked effect on casting quality.



Participants in Michigan Regional Foundry Conference included left to right (top) C. W. Hockman, Cadillac Motor Div., GMC, Detroit; Clyde Sanders, American Colloid Co., Chicago; Frank S. Brewster, Harry W. Dietert Co., Detroit, and J. D. Johnson, Archer-Daniels-Midland Co., Minneapolis. (Center) Prescott L. Goud, Detroit Tank Arsenal, Detroit; Fred J. Walls, International Nickel Co., Detroit; Harry K. Herschmann, National Production Authority, Washington, and Capt. Joseph E. Black, Detroit Tank Arsenal, Detroit. (Bottom) David W. Boyd, Engineering Castings Co., Marshall, Mich.; Richard Herold, Borden Co., New York; Vaughan Reid, City Pattern Foundry & Machine Co., Detroit, and Howard McClelland, Eaton Mfg. Co., Vassar, Mich.

Offers Sample Shell Molds For Experimental Work

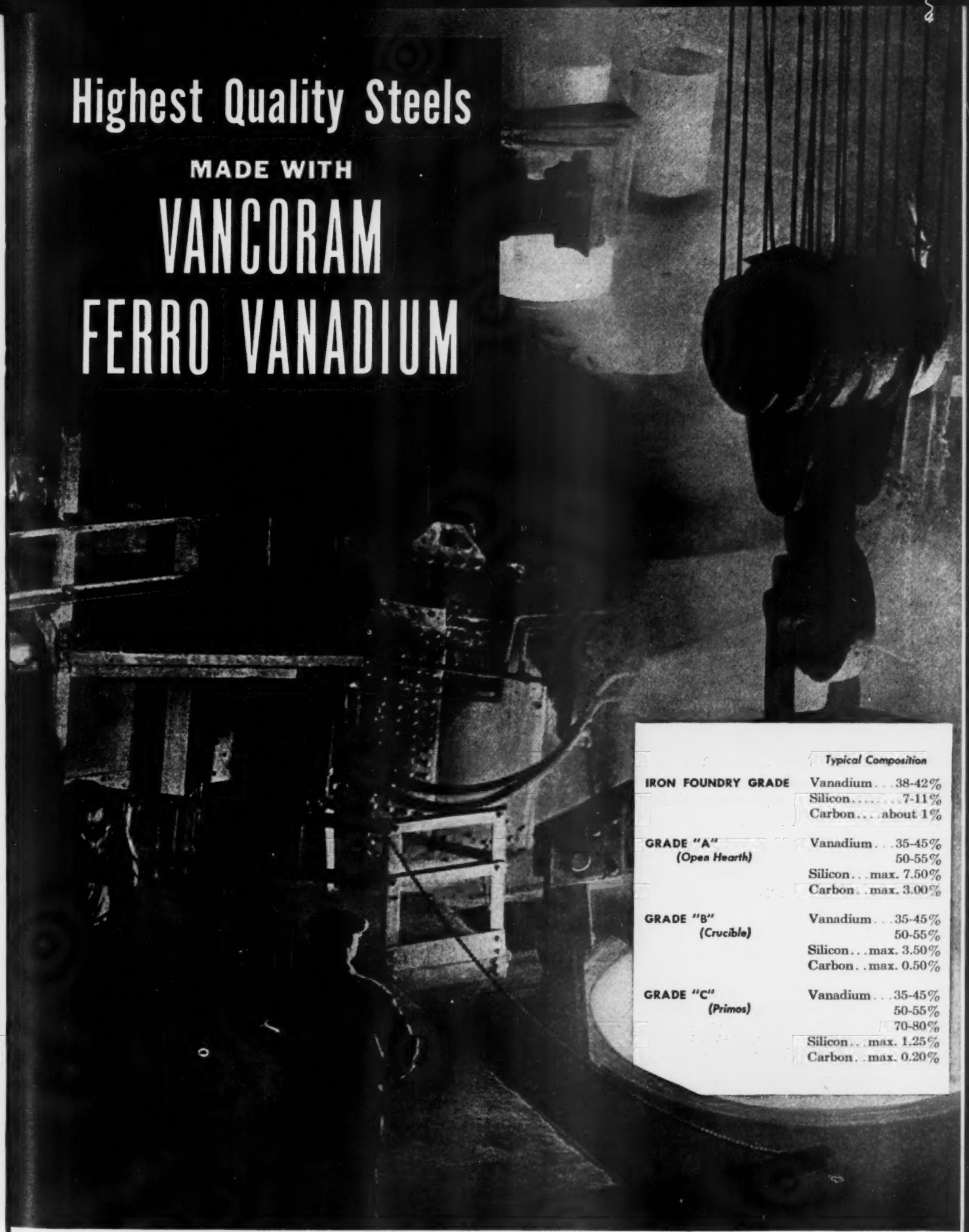
Monsanto Chemical Co., Plastics Division, Room 5706 Springfield 2, Mass., is offering a sample mold service for foundries interested in the shell molding process. Foundries may send a pattern to Monsanto where shell molds will be made with the company's phenolic resins and sand. Both pattern and mold will be returned to the foundry which may conduct its own experimental casting operations.

Monsanto will issue detailed instructions covering specifications for patterns to be used in the experiment. These instructions may be obtained from the Plastics Division.

Norwegian Productivity Team Reports

Technical and operating foundrymen representing the Norwegian foundry industry, with John Sissener as leader and Torolf Krogvig as secretary, toured several foundry centers in the United States from May 5 to June 17, 1950.

General and detailed information on practically every phase of foundry practice, operation and management has been incorporated in a formal 171-page report issued recently. The report is in the Norwegian language; however, one appendix of nine pages gives a summary of the tour in English.



	Typical Composition
IRON FOUNDRY GRADE	Vanadium . . . 38-42% Silicon . . . . . 7-11% Carbon . . . . about 1%
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-45% 50-55% Silicon . . . max. 7.50% Carbon . . max. 3.00%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% 50-55% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% 50-55% 70-80% Silicon . . . max. 1.25% Carbon . . max. 0.20%

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TEXAS REGIONAL CONFERENCE PROGRAM

Draws Large Attendance at Houston

By WILLIAM G. GUDE
Managing Editor
FOUNDRY

TEXAN foundrymen turned out in record number for the second annual Texas Regional Foundry Conference at the Shamrock, Houston, Oct. 19-20. Sponsored by the AFS Texas Chapter and the student chapter of the Agricultural & Mechenical College of Texas, the meeting attracted an attendance of 200; lady visitors brought total registration to 240.

From the standpoints of general arrangements and interest in the exceptionally well diversified technical program presented, the conference proved highly successful. J. R. Hewitt, manufacturers' representative, Houston, was chairman of the general conference, committee; W. H. Lyne, Hughes Tool Co., and F. M. Wittlinger, Texas Electric Steel Casting Co., both of Houston, were in charge of arrangements, and E. C. Brown, Whiting Corp., Houston, headed the program committee.

The conference was opened with a general meeting devoted to sand control and casting defects caused by sand. W. H. Lyne and C. R. McGrail, Texaloy Foundry Co., San Antonio, were co-chairmen. Discussing "Scabs, Buckles and Spalls," John B. Caine, consultant, Cincinnati, said it is a mistake to base sand properties wholly on the sand's performance at room temperature; what we need to know is how sand behaves in contact with molten metal.

Mr. Caine described a series of simple tests to determine sand-metal reaction; these consist of inserting a sand specimen in molten steel for varying periods of time. A detailed discussion of this procedure was presented in FOUNDRY, July 1947. The speaker said the dip tests prove there are at least three causes of scabs, buckles and spalls; these are gas pressure, expansion and contraction, and erosion.

Essentials of sand control comprise more than measuring a few properties such as moisture, permeability and green strength, it was stated by Harry W. Dietert, Harry W. Dietert Co., Detroit. A successful sand control program, he said, should encompass these properties: Structural, green, air-set, dry, hot and retained. Recommended values for each were given. To carry out the control a detailed written procedure should be prepared for each operation, which should be carried out on schedule under the direction of a capable sand engineer.

A second general meeting, under the chairmanship of J. O. Klein, Texas Foundries Inc., Lufkin, Tex., had R. L. McIlvaine, executive vice president, National Engineering Co., Chicago, as speaker on the subject of molding system design. Mr. McIlvaine discussed a number of system details which, although seemingly minor, make considerable difference in the efficiency of the molding system. Among the points discussed were proper design of sand storage bins, prepared sand hoppers, shakeout foundations, spill sand conveyors, molding machine supports, belt conveyors and dust seals. Use of diagrammatic drawings and a model sand storage bin made of transparent material to demonstrate the flow of sand, added to the effectiveness of the speaker's presentation.

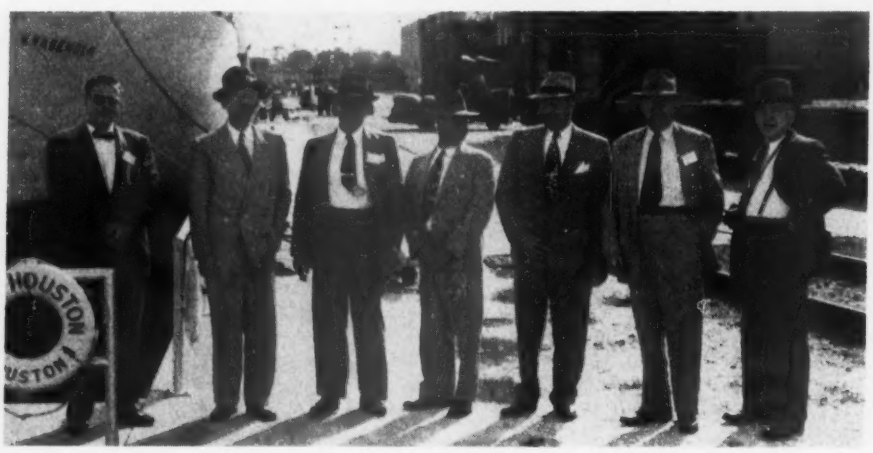
Three sectional meetings concluded the first day's technical sessions. A comprehensive discussion of cupola practice was given before the gray iron group by Howard H. Wilder, Vanadium Corp. of America, Detroit. R. C. Wittlinger, Pioneer Foundry, Houston, was meeting chairman. Points treated in detail by Mr. Wilder and recommended as desirable for good cupola operation included: Good bed building practice and patching technique; uniformity in weighing, charging and tapping; preheating of ladles; maintenance of melting equipment; good records and their application; good housekeeping in the melting department. Cupola records are essential to efficient foundry operations but too often are neglected, with consequent loss of control and wasted dollars, Mr. Wilder said.

Speaker at the nonferrous session was George P. Halliwell, H. Kramer & Co., Chicago, and the meeting chairman E. O Naquin, Oil City Brass Works Inc., Beaumont. In discussing the application of fundamental principles to the melting, pouring and casting of copper-base alloys, Mr. Halliwell emphasized that correct melting practice is a prerequisite in attaining sound castings. Consequently, it is mandatory that this operation be supervised by capable personnel and carried out according to recommended procedure.

The steel session, presided over by Walter J. Temple, Kincaid-Osburn Electric Steel Co., San Antonio, had Ray A. Witschey, A. P. Green Fire Brick Co., Chicago, as speaker. Mr. Witschey discussed various forms of foundry refractories, their properties and recommended applications.

Shell molding was the subject of a morning-long general session under the chairmanship of Marvin W. Williams, Industrial Foundry Corp., Houston. L. G. Probst, National Engineering Co., Chicago, the first of two speakers, gave not only a resume of development of the process, but also an actual demonstration of how shell molds are produced. Mr. Probst described some of the mechanical equipment devised for use with the method, but pointed out that there

(*Concluded on page* 170)



Some of the Texas Conference participants. Left to right: W. H. Lyne, past chairman, Texas Chapter; P. B. Croom, chapter vice chairman; W. L. Seelbach, AFS president; Harry Dietert, Detroit; W. D. Dunn, chairman, Central New York Chapter; M. B. Parker, Memphis, Tenn.; W. W. Maloney, AFS secretary-treasurer

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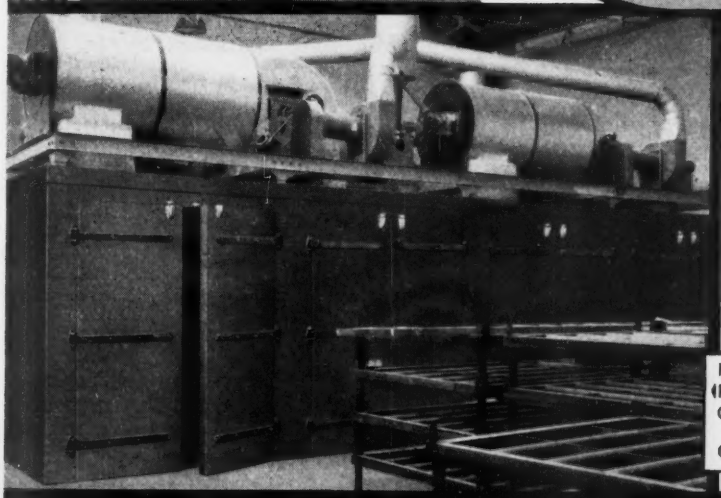

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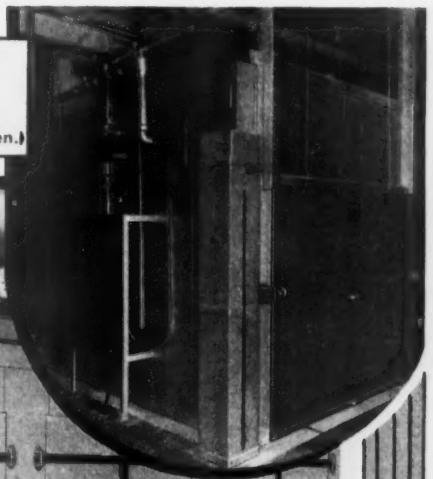
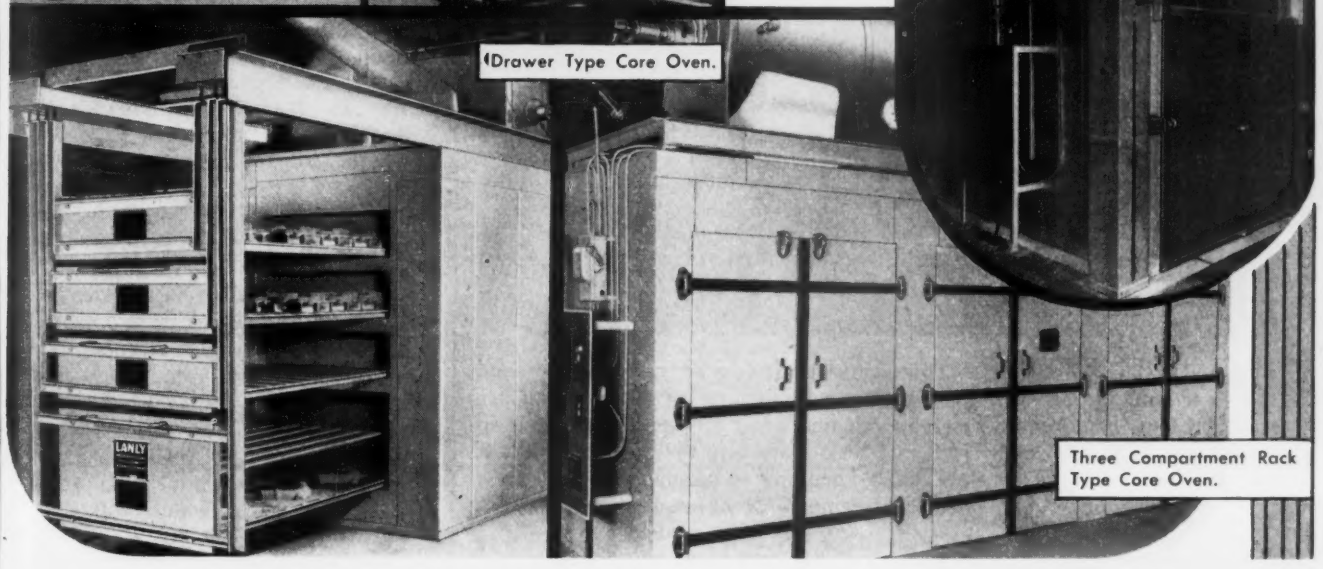


Four Compartment Rack Type Core Oven.

Car Type Core Oven.



Drawer Type Core Oven.

Three Compartment Rack Type Core Oven.

(*Concluded from page* 168)

are few mass producers of shell mold castings today and specific information on techniques employed is limited. Slides were shown of the shell molding practice employed by City Pattern Foundry & Machine Co., Detroit.

J. A. Wickett, Monsanto Chemical Co., Springfield, Mass., pointed out that a compromise must be made between selecting the best sand for shell molds and the type most economical to use. Fineness alone is not the determining factor, since a round grain sand, uniform grain distribution, and freedom from moisture and organic material are other desirable characteristics. AFS fineness of 90 to 140 is usually employed, but amount of the finer grain sands available commercially is limited, he said. Phenolic type is the preferred resin, and for volume production a high rate of resin pickup and cure is necessary.

In subsequent discussion Clyde A. Sanders, American Colloid Co., Chicago, referred to the good potentials of shell molding for certain high-production applications, but he chided foundrymen for their avidity to seize upon something new as a cure for their problems when application of proven principles and use of a fine-grain facing sand would give comparable results.

Program of the last general session, presided over the C. E. Silver, Texas Electric Steel Casting Co., Houston, consisted of two motion pictures. "Mechanization in Molding," a film produced by the Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago, with the co-operation of the Plant and Plant Equipment Committee of AFS, was presented by C. V. Nass, vice president of that company. "The ADM of Cores," depicting control of coreroom operations, was presented by Warner B. Bishop, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland.

Three sectional meetings concluded the technical program. The gray iron session, at which John P. Holt, Basic Refractories Inc., Gary, Ind., discussed "Basic Cupola Operation," had J. H. Kimes, Lufkin Foundry & Machine Co., Lufkin, Tex., as chairman. Mr. Holt's paper starts on page 92 of this issue.

Applications of zircon sand were discussed at a steel session by W. M. Peterson, M. A. Bell Co., St. Louis. L. O. Sturkie, Quality Electric Steel Castings Inc., Houston, was chairman. Mr. Peterson explained that zircon has a high melting point, high density (twice that of silica sand), good heat conductivity and resists wetting by molten metal. He described how it can be used as a facing material to replace chills, to promote directional solidification in a casting and to improve surface finish. These sand mixture compositions for different applications were recommended: Core sand—0.7 lb oil, 0.7 lb cereal binder, 2 per cent moisture per 100 lb sand; green sand mix—1½ lb western bentonite, 1½ per cent water per 100 lb sand; dry sand mix—2¼ lb western bentonite, 0.5 lb corn flour, ¾ per cent moisture per 100 lb sand. Mr. Peterson also described use of zirconium silicate as a wash to reduce burnon and metal penetration.

The nonferrous session heard a discussion of "Insulating Sleeves" by Michael Bock II, Exomet Inc., Conneaut, O. John G. Collier, Garrott Brass & Machine Co., Houston, presided. Mr. Bock described how riser sleeve applied to copper-base alloy castings will keep the riser metal liquid as much as four to five times as long as when no insulation is provided, thereby promoting more effective feeding, a sounder casting and a 40 to 50 per cent saving in riser metal poured.

Insulating or mildly exothermic material also should be used on top of the risers, the speaker stated. However, a highly exothermic material is not advisable, because apparently copper's high heat conductivity causes metal far down in the casting to develop dendrites, resulting in weakness, shrinkage and often leakage. Mildly exothermic material has been found useful when the metal is poured on the cold side.

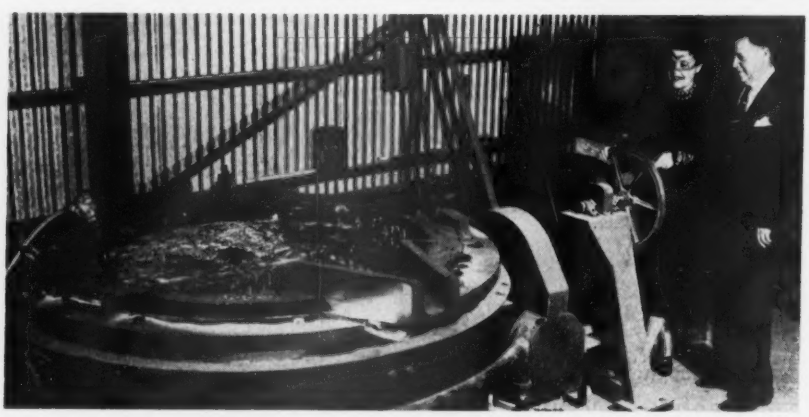
Walter L. Seelbach, national AFS president, was principal speaker at the Friday luncheon presided over by P. B. Croom, Houston Pattern Works, and Texas Chapter vice chairman. Mr. Seelbach discussed various of the major activities of the national organization and related some of his experiences at the recent International Foundry Congress in Brussels.

Featured entertainment of the conference was a Texas barbecue Friday evening at the Grand Prize Brewing Co.'s garden. Guests were entertained by a show furnished by the Lone Star Steel Co.

Present Scholarships

Chapter Chairman John M. Bird, American Brass Foundry, Fort Worth, presided at the annual banquet concluding the conference. This was the occasion for presentation by the chapter of scholarships to two Texas engineering students. These awards, duplicating two made a year ago, went to Marvin A. Drews, University of Texas, and Cecil F. Adicks, Texas A and M College. William W. Maloney, national AFS secretary-treasurer, discussed plans and the tentative program for the 1952 International Foundry Congress and Show.

Principal banquet speaker was Paul Weaver, technical assistant to the vice president, Gulf Oil Corp., Houston, who was introduced by F. M. Wittlinger, Texas Electric Steel Casting Co. In his talk on "The Battle of the Metals," Mr. Weaver traced the development of applications for different types of metals. This competition between metals and products, accompanied by the freedom of individuals to buy what they choose, has made ours a diversified economy, he said. Consequently, it is vital to resist government restrictions which may stifle this competition and excessive taxation which will destroy the freedom to buy.



MR. AND MRS. William B. Modglin, president and vice president, respectively, of Modglin Co. Inc., Los Angeles, manufacturer of plastic products, were present to make the first pour of zinc alloy for drop hammer dies at the new $500,000 Metal Products Division, marking the company's entry into the metal fabrication field. The company is planning considerable expansion to help meet requirements of defense orders

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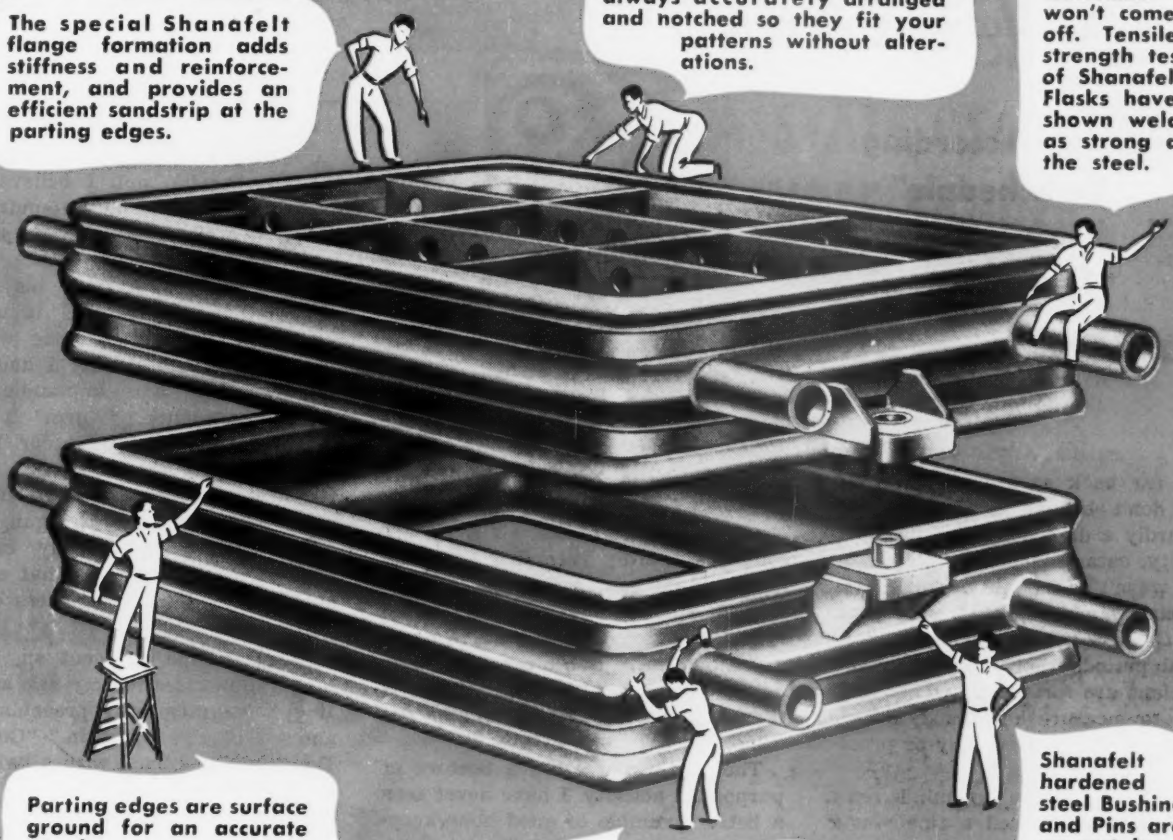

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MAN-TO-MAN

on the Molder's Bench

"Worry According To Schedule"

By RALPH L. LEE

AS far back as I can remember, I don't believe there has been hardly a day in which some dire calamity, catastrophe, war, plague or panic wasn't either threatening, approaching or already down on us. And I don't believe I can recall any of those normal periods that economists and politicians are forever using as yardsticks to measure how good, bad or indifferent things are today or promise to be in the future.

All of this came to mind some time back as I joined a fine young fellow on my way to visit his foundry. With the words "Howdy Doc, you old so and so" still on his lips he wagged his head and, with a look of doom, started off on his sad lament. "Things can't go on the way they are, Doc! Taxes, regulations, allocations and labor squabbles, together with the cockeyed political shenanigans goin' on—Doc! What in Heaven's name is going to become of us?"

I don't know just how I managed it, but I dodged the question and began prying the conversation over into more cheerful channels. As I grow older I find my breakfast bacon and eggs seem to clog the old tract if I start viewing anything with alarm too early in the morning.

I wish you could have seen the change come over my young friend's face when he began telling me about his new sailboat. I honestly believe he would still have been talking about water, winds, logs and navigation if he hadn't been collared by one of his foundry lieutenants as we walked through his front door.

Once we got inside nothing could have stopped me from abandoning ship talk for foundry talk, for there was much to talk about in his bang-up A No. 1 shop.

As I visit foundries all over the country I hardly ever find one that does not shine in some respect—but this one shone all over. Every feature I had pictured that the ideal foundry should have was already in place doing business, including some I thought only the future would develop.

The whole place was a beehive of purposeful activity. I have never seen a better example of good housekeeping. Everything was in order from scrap, sand and supply bins to the few dark corners of miscellaneous storage. There was little or no back tracking from production planning clear through melting, sand conditioning, molding, cleaning and packing for shipment. The whole gang to a man upheld one of the highest standards of quality I have ever seen. And, as it invariably follows, they had an enviable safety record with kingsize safety record boards posted in every department.

Ralph Lee

But the prize package of all, in my book, was their engineering department—the thing I have been dreaming and preaching about since Hector was a pup. Two graduate engineers were spending all of their time splitting the atom of cantankerous operating problems, digging up new dope on old methods, new methods, new apparatus and making definite and specific suggestions for all departments. (Out of ninety suggested projects last year eighty some were accepted.)

I hope you don't think I'm gilding the lily, for I'm not. I believe that almost any open-minded foundryman would have felt the same way as I after a trip through the place.

When we got back to his office he knew dern well that it was a waste of words to ask me what I thought of the place, for I had been ohing, ahing and applauding all through the trip. "Norm" I said, "even though I'm an amateur, I have been around a lot and I'd like to tell you what I am sure you already suspect—that you and your gang have demonstrated what really can be done in a foundry and what a good business the foundry business can be to be in.

"Now I hope," I went on, "you'll make allowances for my age and the finger wagging and preaching I'm about to indulge myself in." "Go ahead Doc," he came back with a twinkling eye, "enjoy yourself."

"This morning, the minute I met you you cut loose with the popular businessman's lament by viewing with alarm the mess certain so and so's have got us into and the certain doom awaiting us if things keep on as they are. It's getting so nowadays that instead of business men greeting each other with 'Howde do' or 'How's it goin' it's 'Woe is us.'

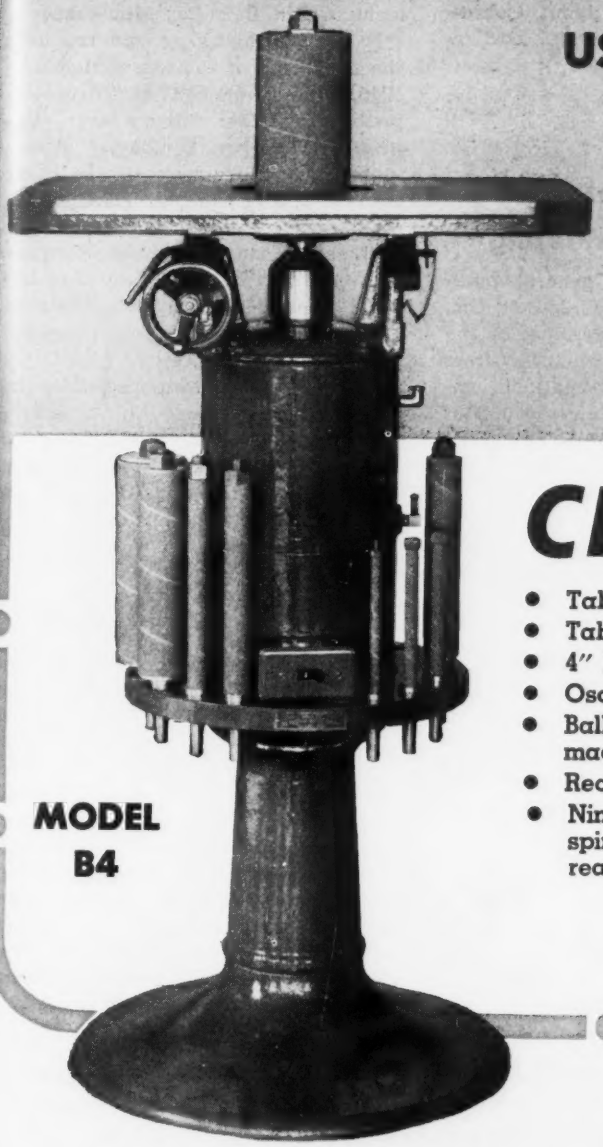
"Now here's a thought," I went on. "If we were to take all of the style-cramping regulations, regimentation and confiscatory taxes now loaded down upon us, and subtracted from the total items those unjustly imposed upon us by conniving, unscrupulous, self-seeking culprits, I honestly believe that when we got through we'd find we'd still have about 90 per cent of the items left, no matter who held the reins.

"With millions of Orientals waking up, Russia ganging up and political and social unrest all over the world, including the good old U.S.A., we've got to gang up too to save all we hold dear, including our hides.

"Under these conditions it just seems to me that if we fail to separate the restrictions which have to be from those which don't have to be

(*Concluded on page* 174)

USE FREEMAN EQUIPMENT
IN YOUR PATTERN SHOP
FEWER DELAYS
AND MORE PRODUCTION
WITH A STATE OSCILLATING SPINDLE SANDER



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Mahogany and Pine Pattern Lumber

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(*Concluded from page* 172)

and bellyache about both kinds all mixed together, we are not only dishonest with ourselves but we are needlessly hamstringing ourselves by spending our days and doing our jobs under false clouds of doom."

Then I told Norm that I believe everyone is entitled to one period each day where he can concentrate on the job of viewing with alarm to his heart's content. But after getting it out of his system he should make his mind behave and go about his business with the decks cleared and all of his faculties on the job.

I suggested to Norm that he might like to try an experiment I have been running. I don't read the newspaper at breakfast any more so I won't be haunted all day by wars, new taxes, rape, floods, volcanoes, dope peddlers and absconding bank tellers. But I insisted I am also entitled to one period of the day which I can set aside, exclusively, for viewing with alarm and making up my mind to do something about things. Then I added that, after careful thought, this worry period should not represent more than 10 per cent of my waking hours. Any more than this would be plain unadulterated self-indulgence or, far more likely, a device for escaping my responsibilities.

I apologized to Norm for this long-winded tirade, but doggone it if he didn't thank me, and I honestly believe he meant it. Shucks! Life is short, with so many interesting things to do and think about. Confucius, or whoever it was, said a mouthful—"Enjoy yourself, it is later than you think."

Conveyor Manufacturers Hold Annual Meeting

G. Walter Ostrand, general manager, Caldwell Plant, Link-Belt Co., Chicago, was elected president of the Conveyor Equipment Manufacturers Association at the association's annual meeting at the Homestead, Hot Springs, Va., Oct. 30. He succeeds L. B. McKnight, executive vice president, Chain Belt Co., Milwaukee.

R. C. Sollenberger, who has been the staff head of the association since 1945, was re-elected executive vice president. Other officers are: Vice president, Harry C. Davis, general manager and chairman of the board, Kanawha Mfg. Co., Charleston, W. Va.; treasurer, R. F. Tomlinson, general sales manager, A. B. Farquhar Co., York, Pa.; and Lee Sekulski, sales manager, Mathews Conveyer Co., Ellwood City, Pa., re-elected secretary for a second term.

The following were elected to the executive committee: J. A. Jeffrey, vice president, Jeffrey Mfg. Co., Columbus, O.; J. E. McBride, vice president, Palmer-Bee Co., Detroit, and Mr. McKnight.

"Some dentist in Oshkosh ordered it!"

Issues Scrap Stickers

As part of its program to aid the national drive for scrap, the Gray Iron Founders' Society, Cleveland, has developed red, white and blue stickers bearing the message, "Foundries Need Scrap—Keep It Moving." These are being distributed to member companies for attachment to outgoing correspondence. D. H. Workman, GIFS executive vice president, predicts the gray iron industry will melt over 11 million tons of ferrous scrap in 1951 to meet estimated shipments of 15 million tons of castings.

Meetings of Interest to Foundrymen

Dec. 6-8—American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Hotel William Penn, Pittsburgh.

Dec. 10-15—Spanish Iron & Steel Institute, general assembly, Madrid, Spain.

1952

Jan. 14-17—Plant Maintenance Conference and Show, Convention Hall, Philadelphia

Jan. 17-19—California Regional Foundry Conference, Northern and Southern California Chapter, AFS, San Francisco

Jan. 18 — Malleable Founders' Society, semi-annual meeting, Hotel Cleveland, Cleveland

Feb. 7-8—Wisconsin Regional Foundry Conference, Wisconsin Chapter, AFS, and University of Wisconsin, Hotel Schroeder, Milwaukee

Feb. 14-15—Foundry Educational Foundation, technical and university advisory committees conference, Hotel Statler, Cleveland

Feb. 21-22—Birmingham Regional Foundry Conference, Birmingham District Chapter and University of Alabama student Chapter, AFS, Tutwiler Hotel, Birmingham

Feb. 22—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Mar. 3-7—American Society for Testing Materials, spring meeting, Statler Hotel, Cleveland

Mar. 7—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

Mar. 18-19—Steel Founders' Society, annual meeting, Edgewater Beach Hotel, Chicago

Mar. 28—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Apr. 25—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

May 1-7—American Foundrymen's Society, International Foundry Congress and Show, Atlantic City, N. J.

May 6-9—International Lighting Exposition and Conference, Public Auditorium, Cleveland

May 16—Malleable Founders' Society, eastern sectional meeting, Commodore Hotel, New York

May 23—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

June 16-17—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

June 23-27—American Society for Testing Materials, annual meeting, Statler Hotel, and Hotel New Yorker, New York

July 25—Malleable Founders' Society, western sectional meeting, Drake Hotel, Chicago

Sept. 8-12—Instrument Society of America, annual meeting, Cleveland

Oct. 16-17—Gray Iron Founders' Society, annual meeting, Hotel Cleveland, Cleveland

Oct. 16-18—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 20-24—American Society for Metals, National Metal Congress and Exposition, Philadelphia

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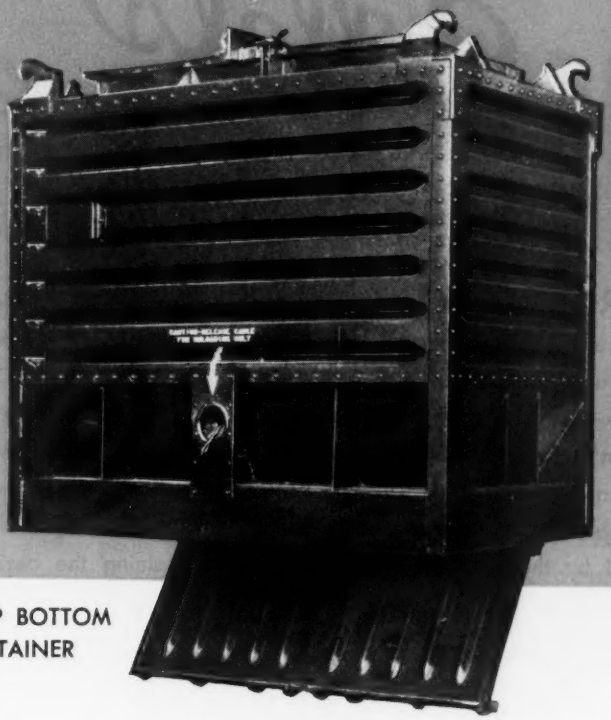

DROP BOTTOM CONTAINER

CONTROLLED DISCHARGE CONTAINER

These newly developed steel containers, shown at the recent Materials Handling Exposition in Chicago, are already assisting in varied types of industries in the handling of bulk materials, adding speed to the process, and, at the same time, cutting the costs thereof.

At the left, above, is the Drop Bottom Container, which permits a *quick* and *complete* discharge of its contents. Designed to handle both fine and coarse materials, the container may be unloaded either by (1) opening the bottom door by means of a cable release while container is suspended in mid-air, or (2) by placing container on the ground, releasing the discharge door and then slowly raising the container. The container is equipped with an automatic locking device, which insures locking when the container is placed on the ground. This container can be furnished with a top, weather-proof door, or can be an open-top type, depending on the customer's needs. The container weighs about a ton, will take a load up to eight tons, and has a capacity of 145 cubic feet.

At the right, above, is the Controlled Discharge Container which is equipped with a geared type rotary discharge valve so as to secure controlled flow & *partial* discharge of its contents. The container has a hopper type bottom with a single opening of approximately 18 inches, extending the full width of the container. The valve is automatically locked when in the closed position. This container can be open-top design or equipped with a weather-proof cover. Weighs slightly over one ton and will hold up to eight tons. This container, similarly, has a capacity of approximately 145 cubic feet.

Let us consult with you on your problems of handling bulk materials

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CARBON FREE LIQUIDIZER

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is the leader in major foundries for use on both ferrous and non-ferrous metals and also in ingot production. It is the original scientific non-carbon, exothermic compound for feeding heads and risers. When applied on the heads or risers, CARBON FREE LIQUIDIZER reacts within itself exothermically, producing a temperature above 3200° F. It actually increases the temperature of the feeding metal to a point well above that of the metal in the main body of the casting, thus ensuring that the feeding metal will be the last to freeze. In this manner, shrink cavities in the casting caused by premature freezing of the feeding metal are eliminated. After the exothermic action has ceased, the LIQUIDIZER forms a soft refractory insulating blanket on the metal. This confines the heat generated by the LIQUIDIZER and aids in maintaining the desired high temperature of the feeding metal in the heads or risers.

SOFFEL'S THERMOTOMIC HOTOP

A new exothermic carbon free LIQUIDIZER for heads and risers of castings of iron or steel. Does not contain any powdered metal and can be used on any ferrous alloy without danger of contamination. In many foundries riser height reductions of 50 to 70% have been obtained; individual casting yields have been increased as much as 15 to 20%. SOFFEL'S THERMOTOMIC HOTOP will develop well over 4000° F. without affecting the chemical analysis in the heads or castings. It forms a porous insulating slag cover which further delays cooling of the metal in the heads and aids directional solidification. SOFFEL'S THERMOTOMIC HOTOP is different than any other head compound on the present market. Order a trial sample which is guaranteed to produce a reduction of riser heads.

Soffel's Thermotomic Compound
for all metals and alloys

Patented

SOFFEL'S THERMOTOMIC COMPOUND is an exothermic molding compound which is molded and baked into any desired shapes just as sand cores are made. It is used as ring inserts under the risers or feeding heads and blind riser cracker cores. Also as a facing insert where it is desirable to maintain the fluidity of metal in the mold at those points where rapid cooling may cause piping, shrinkage or segregation. It produces a temperature up to 3500° F. Great savings are realized through the reduction in height of risers as well as the cost of removing feeding heads. SOFFEL'S CARBON FREE LIQUIDIZER should be used on top of the feeding heads in conjunction with the use of SOFFEL'S THERMOTOMIC COMPOUND. For aluminum and magnesium THERMOTOMIC ABC and AL-X31 LIQUIDIZER on top of the heads is recommended. Write for descriptive literature.

BEWARE OF IMITATIONS! We are the originators of EXOTHERMIC CARBON FREE LIQUIDIZER and THERMOTOMIC COMPOUNDS

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Activities of Foundry

GROUPS

Chicago

FOUR roundtables featured the Nov. 5 meeting of the Chicago Chapter, AFS, at the Chicago Bar Association and attracted an attendance of almost 200.

In his opening remarks, Chapter President Walter W. Moore announced future program events. The regular meeting on Dec. 3 has been designated International Night, with AFS National Vice President I. R. Wagner, Indianapolis, to pay a visit and outline plans for the International Foundry Congress and Show in Atlantic City next May. Annual Ladies' Night is scheduled for Feb. 23 at the Palmer House. Educational activities are still in the preliminary stage but probably will include a melting symposium to start in February.

Chapter Vice President John H. Owen, introduced roundtable chairman and speakers.

Gray Iron Division devoted its attention to "Gray Iron Patterns," with Robert Hendry, superintendent, Love Bros. Inc., Aurora, Ill., as chairman, and discussion panel consisting of Karl Blohm, superintendent, Lindgren Foundry Co., and Joseph J. Shallerer, owner, Calumet Pattern Works.

Clyde A. Sanders, vice president, American Colloid Co., addressed the Steel Division on "Steel Foundry Sands." Roy W. Schroeder, assistant professor, Navy Pier Branch, University of Illinois, was chairman.

"Melting Practice" was the topic considered by the Malleable Division, presided over by Cecil F. Semrau, metallurgist, Illinois Malleable Iron Co. The discussion panel was composed of H. W. Maack, chief metallurgist, Crane Co.; Russell Drews, McCormick Works, International Harvester Co.; T. A. Cizma, superintendent of melting, Cicero plant, National Malleable & Steel Castings Co.; Joseph C. Gaffney, Moline Malleable Iron Co., St. Charles, Ill.; and William Moran, foundry superintendent, William E. Pratt Mfg. Co., Joliet, Ill.

Kurt A. Mierecke, Bentonite sales manager, Baroid Division, National Lead Co., addressed the Nonferrous Division on "Use of Bentonite in Nonferrous Foundry Sands." Chairman was Fred Riddell, chief metallurgist, H. Kramer & Co.

Principal speaker for the Dec. 3 chapter meeting will be D. A. Farrell, superintendent of safety, United States Steel Co., Pittsburgh. His subject is titled "The Three C's of Safety."—*Erle F. Ross*

Canton

PRESENTATION of the film "The ADM of Cores" featured the Nov. 1 meeting of Canton District Chapter of the AFS. Approximately 100 members and guests were present to participate in this discussion on cores.

Lawrence E. Rayel of the Foundry Products Division, Archer-Daniels-Midland Co., led the discussion period which followed the film's showing. C. B. Williams, Massillon Steel Casting Co., chairman of the chapter, presided; and A. O. Prentice, Stark Foundry Co., program chairman, introduced the speaker.

On Jan. 13 the chapter will sponsor a "Stump the Experts" program which will be held at the Elks' Club, Canton. Experts on the panel will be: Charles Bunting, Rockwell Mfg. Co., Barberton, O. for malleable iron; H. A. Biddinger, F. E. Myers & Bros. Co., Ashland, O., for patterns; Harold Templeton, Babcock & Wilcox Co., Barberton for steel castings; and Lawrence Weaver, United Engineering & Foundry Co., Canton for gray iron. Quiz master will be William T. Cole.—*William T. Cole, Canton Malleable Iron Co.*

Reading

FEATURED speaker at the Oct. 16 meeting of the Reading Foundrymen's Association was Elmer C. Zirzow, director of foundry service, Werner G. Smith Inc., Cleveland, whose topic was "Fundamentals of Foundry Sand Practice."

Mr. Zirzow pointed out that a foundry sand is considered to have a good distribution when 50 per cent of the grains spread over three screens and the rest gradually tapers off from those screens. In natural bonded sand, there is no choice as to amount of bond present. What bond is in the sand is placed there by nature. The bond destroyed by the casting process is replenished by the addition of new sand. In synthetic, or rebonded sands, there is a choice of bond such as bentonite, fire clay or illite.

Although sand and bonding materials are the chief constituents of all molding sands, other ingredients also are present. These compounds, used chiefly for atmospheric control within the mold cavity, are: Cereal binders, sea-coal, resins, pitches, and oils. The speaker stated that moisture is the most important factor in foundry sands. The lowest moisture

(*Continued on page* 179)

CANTON DISTRICT Chapter of the AFS met Oct. 4 to hear Bruce L. Simpson, National Engineering Co., Chicago, speak on "The History and Development of the Foundry Industry." Left to right are: Fred Fuller, National Engineering Co.; Mr. Simpson; Edward H. Taylor, Myers Pump Co., Ashland, O., past chapter chairman; A. O. Prentice, Stark Foundry Co., Canton, O., and C. B. Williams, Massillon Steel Castings Co., Massillon, O., chapter chairman

Shown are Fremont Flasks and Jackets as used at Burt Foundry Co., Toledo, Ohio.

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Talk About Ease Of Handling

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Write today for literature.

The Fremont FLASK CO.

FREMONT, OHIO

(*Continued from page* 177)

to produce the best castings should be the general rule of the foundry; it can vary from 2 to 9 per cent. In Mr. Zirzow's opinion, the foundry sand technician's job is as important as that of the metallurgist—good sand and good metal practices yield good castings.—*Joseph L. Grenko, Textile Machine Works*

Tennessee

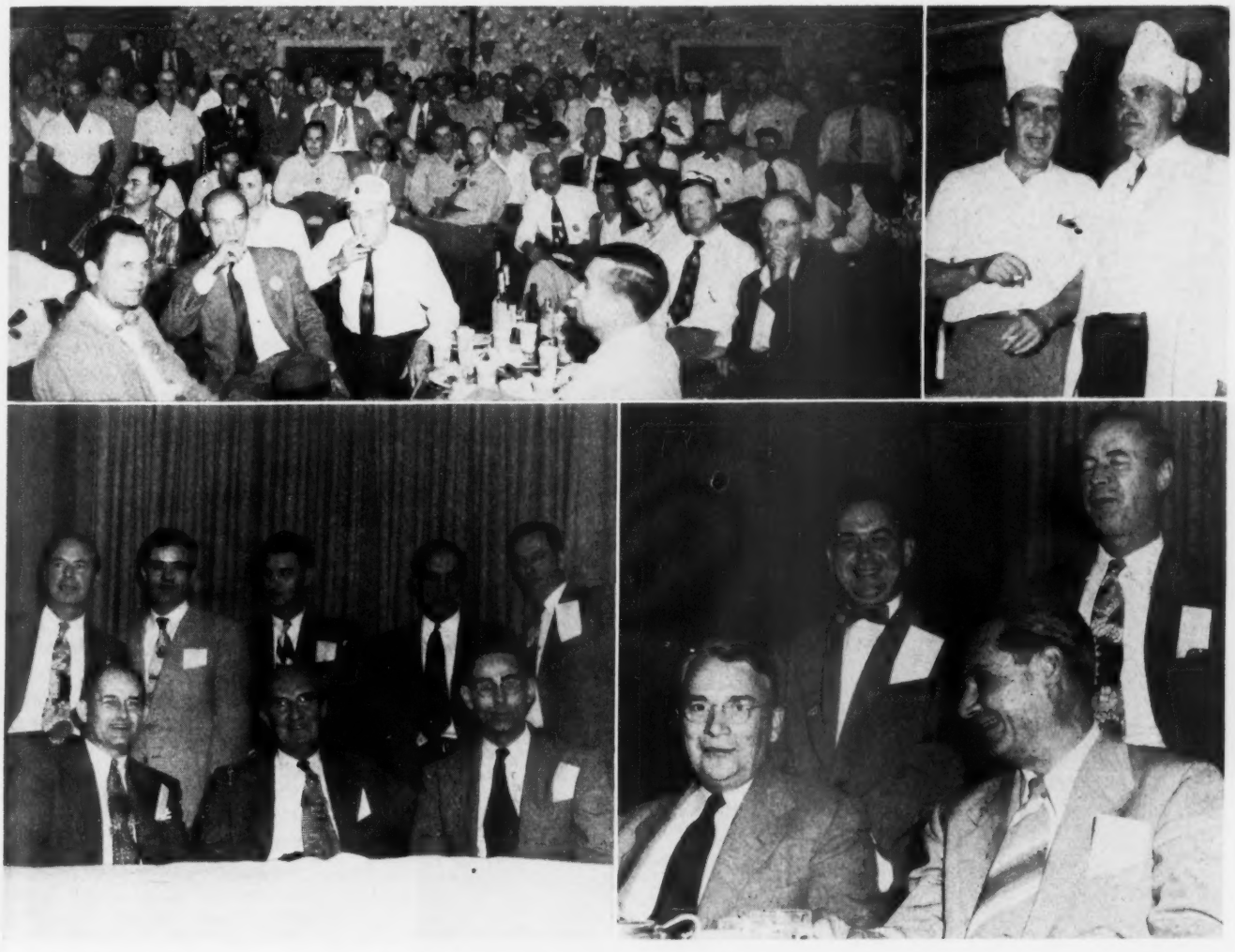
SPEAKER at the opening meeting of Tennessee Chapter of the AFS was Frank G. Steinebach, editor of FOUNDRY. The meeting was held at Hotel Patten, Chattanooga, Sept. 28. Porter Warner Jr., Porter Warner Industries, chapter chairman, presided. Approximately 40 members and guests heard Mr. Steinebach's address on "Foundries in the Defense Effort." The speaker advised foundrymen to procure all the defense work possible whether it be on the prime or subcontract basis. He also urged foundrymen to tell their story to their congressional representatives so that the foundry industry would receive an equitable share of allocated mateals.

An old-time Alabama barbecue was enjoyed by members of the Tennessee Chapter, Sept. 22, at Signal Mountain Golf and Country Club near Chattanooga, and was attended by 325 guests. Chiefly responsible for the barbecue was Tink Johnson, plant superintendent, Somerville Iron Works, who says that his recipe has been handed down in his family from generation to generation and is now approximately 110 years old.

The chapter has decided not to hold a technical meeting in December. The next meeting, to be held Jan. 25 at Hotel Patten, Chattanooga, will feature F. S. Brewster, Harry W. Dietert Co., Detroit, whose topic will be *"Foundry Sands."—Charles R. Appel, U. S. Pipe & Foundry Co.*

Birmingham

APPROXIMATELY 100 members and guests attended the October meeting of Birmingham District Chapter of the AFS. Tom H. Benners, chairman of the chapter's educational committee, explained the AFS apprentice contest in which several members expressed interest. He then introduced the speaker, Fred G. Kramer, general sales manager, American Silica Sand Co., Ottawa, Ill., who spoke on "Traveling with a



TENNESSEE Chapter of the AFS held two meetings in September. At top are views taken at the chapter barbecue Sept. 22, Signal Mountain Golf and Country Club near Chattanooga. At right, left to right, are: Fred McGee, assistant cook, and Tink Johnson, Sommerville Iron Works, chief cook. Lower views were taken Sept. 28 at Hotel Patten, Chattanooga. Crane Co. employees, largest group at the meeting, are shown at left. At right, left to right, are: Frank G. Steinebach, editor, *Foundry*, speaker at the meeting; Dick Kirchmayer, Sterling Wheelbarrow Co., chapter secretary; Porter Warner Jr., Porter Warner Industries, chapter chairman, and W. M. Hamilton, Crane Co., program chairman. Top photos courtesy of W. L. Austin, U. S. Pipe & Foundry Co. Lower photos by Frank M. Robbins Jr., Robbins & Bohr Co.

Grain of Sand."

John F. Drenning, secretary-treasurer of the chapter, reported the annual outing and barbecue held in September was a financial success and the attendance was the largest on record. In the absence of Chairman Charles K. Donoho, Fred K. Brown, Adams, Rowe & Norman Inc., presided.—*J. P. McClendon, Stockham Valves & Fittings*

Pittsburgh

OCTOBER meeting of the Pittsburgh Foundrymen's Association was attended by over 100 members and guests and was held at the Fort Pitt Hotel. The subject of "Evaluation of Cleaning Costs" was covered by A. S. Wyborski, Peninsular Grinding Wheel Co., and B. L. Ballard, Ingersoll-Rand Co. At the conclusion of their talks a 40-minute sound film describing the various operations carried on in the Ford Motor Co. foundry was presented.

Mr. Wyborski stated that aside from using correctly specified grinding wheels, savings can result from doing the job on the correct machine, using the proper bond, and maintaining correct wheel speeds. Of equal importance is the use of correct size wheels and availability of sufficient power to do the job. Pressure devices are advisable when available. Foundrymen were advised to keep vibration to a minimum in spindles and bearings and with holding fixtures on sling frames.

During his portion of the discussion, Mr. Ballard stated that abuse of pneumatic tools is causing foundrymen losses of time, production, and money. Too often the same air hose supply is used for chippers and grinders, which is not advisable.

The speaker said that since workmen may not complain when their equipment is not functioning properly, a regular repair program should be set up to check equipment deficiencies. Grinders should be checked for air consumption and speed and their performance tested. Chipping hammers should be checked for piston wear, barrel wear and nozzle wear. He concluded by listing abuses of equipment in use today. Greatest among these are power loss from improper hose and piping, improper maintenance and improper lubrication.—*Dan Reebel.*

PINE STATE Foundrymen's Association held its opening meeting Oct. 11

Pine State

FOUNDRYMEN from Maine met in Portland Oct. 11 for the first general meeting of the Pine State Foundrymen's Association this season. The program included an address of welcome by the association's president, a technicolor movie of the iron founding industry in New England, and a defective casting clinic.

Alexander Wright, Springfield Facing Co., was moderator of the clinic. Discussion covered various defects but the greatest interest centered around the problem of putting on sufficient feeders to control porosity and still be able to minimize the work attendant to knocking off risers.

Next meeting will be held Dec. 13 and will include a talk by Clyde Sanders, American Colloid Co., and entertainment in the form of a Christmas party.—*Walter A. Sokolosky, Saco-Lowell Shops*

Washington

FEATURED speaker at the Sept. 20 meeting of Washington Chapter of the AFS was Warner B. Bishop, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland. Mr. Bishop supplemented his talk on "Foundry Core Binders" with a film, "The ADM of Cores."

The speaker stressed the importance of knowing and controlling the moisture content of core mixes. To illustrate, a mix containing 1 per cent oil and 1 per cent moisture and no cereal developed a baked strength of 170 pounds, whereas a similar mix containing no moisture produced a baked strength of 250 pounds. He recommended a cereal-to-moisture ratio of 1 to 4 to produce the best baked strength and also emphasized the importance of control in baking cores. Experiments indicate that a baking temperature of 425° F gives the best results, generally speaking. As to mixing sequence he reported that experiments show best green compression and baked strengths when a sequence of cereal, water and oil is followed.

The Oct. 18 meeting of Washington Chapter was designated "Patternmakers' Night." E. J. McAfee, master patternmaker from the Puget Sound Naval Shipyard, Bremerton, Wash., was the principal speaker. Mr. McAfee presented a short resume of

(*Continued on page* 182)

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Refractory Strainer Core Shapes
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The selection of the proper refractories of uniformly high quality and their correct applications are extremely important factors in foundry operating economy. Interruption of normal operations, and material and labor costs for repairs are included in the overall refractory maintenance cost.

Harbison-Walker offers a complete line of scientifically-developed, time-tested refractories available from nearby plants and warehouses; and services based on a wide background of experience for guidance in the correct selection and application.

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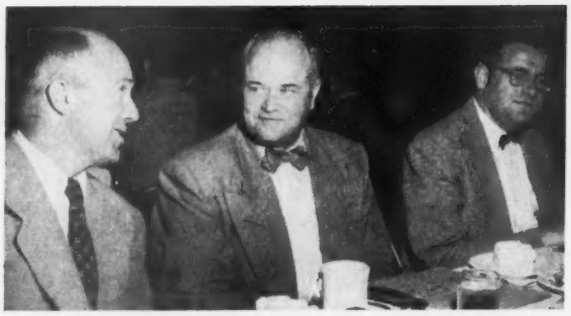

CENTRAL ILLINOIS Chapter of the AFS met Oct. 1 at the American Legion Home, Peoria, Ill., to hear National AFS Director F. G. Sefing speak on "The Foundry's Responsibilities in an Educational Program." Shown at the meeting, left to right, are: Professor Leach, University of Illinois; A. V. Martens, Pekin Foundry & Mfg. Co., and Edward Roby, Peoria Malleable Castings Co. Photo by courtesy of Fred Brosmer, Caterpillar Tractor Co.

(*Continued from page* 180)

his work on a patternmakers' manual after which he showed a film entitled "Let's Get Acquainted," produced by Kindt-Collins Co., Cleveland, manufacturer of pattern supplies. The film shows the manufacture of various items used in patternmaking. It also included a complete description of the molding, pouring and finishing of pressure cast aluminum matchplates.—*Harold R. Wolfer, Puget Sound Naval Shipyard*

Chesapeake

TWO interesting speakers highlighted the October meeting of Chesapeake Chapter of the AFS in Baltimore. Stanley Brah, Rustless Iron & Steel Co., delivered the coffee talk, discussing the problems of training help in industry today. He emphasized that industry must devote more time and energy to training to be able to carry on in the future.

"Resin Bonded Core and Shell Molding" was the technical topic for the evening and it was well covered by Richard Herold, manager, foundry products department, Borden Co., New York. In describing the pattern equipment required, Mr. Herold pointed out that the best results are obtained from either iron or brass patterns which are heated to 300 and 500° F. A dry resin sand mix is then dumped on the hot pattern surface. Heat from the pattern dissolves the resin to a thickness depending on the length of time the mix is left on the pattern. Then the newly formed shell is removed from the surplus mix and cured in an oven to harden it further. After the cope and drag shells are clipped together and backed up with shot, the mold is ready for pouring.

For the nightcap, A. A. Hochrein, Federated Metals Division, American Smelting & Refining Co., briefed the group on the chapter's annual and popular oyster roast which is to be held Jan. 12.—*Joseph Danko Jr., Arlington Bronze & Aluminum Corp.*

Michigan State

STUDENT chapter of the AFS at Michigan State College, East Lansing, Mich., held its first meeting of the current year, Oct. 9, in the Union Building. Chapter President Wesley Hauschildt spoke briefly outlining the advantages of membership in the AFS, and then introduced the speaker, Collins L. Carter, president, Albion Malleable Iron Co., Albion, Mich.

Mr. Carter spoke on the factors involving the satisfactory rate at which graduate engineers should be absorbed by the industry. He also mentioned the various training programs available to graduate engineers entering the foundry industry. Mr Carter pointed out that a good foundry engineer must have practical experience to supplement the theoretical training offered in engineering curricula. He also spoke of the diversified work available in the metal castings industry. Mr. Carter then introduced Richard Dobbins, a 1951 MSC graduate, who described his experiences in the training program offered by Albion Malleable Iron Co.—*Gene Rundell.*

Eastern Canada

A NEAR-CAPACITY audience of 150 attended the opening technical meeting of the 1951-52 season of Eastern Canada Chapter of the AFS at Mount Royal Hotel, Montreal, Oct. 12.

Feature of the meeting was the motion picture "Mechanization in Molding," produced under the auspices of the AFS Plant and Plant Equipment Committee by Beardsley & Piper Division of Pettibone Mulliken Corp. The picture has a sound track commentary by C. V. Nass, vice president, Beardsley & Piper Division, and was introduced by him in person. The film illustrates examples of varied types of foundry mechanization which have been expertly photographed in several modern foundries. Many examples of molding machines and equipment were shown, including devices for automatic flask, jacket, mold weight, and bottom board manipulation. Following the picture, Mr. Nass answered questions from the audience.—*A. E. Cartwright, Crane Ltd.*

MICHIGAN STATE COLLEGE Chapter of the AFS held its first meeting of the season Oct. 9 at the Union Building on the campus. Shown above, left to right, are: Wesley Hauschildt, chapter chairman; Richard Dobbins, engineering trainee, Albion Malleable Iron Co., Albion, Mich.; Ashley Sinnett, chapter vice chairman, and Collins Carter, president, Albion Malleable Iron Co.

New Jersey

REGULATIONS affecting foundries issued by the National Production Authority were discussed at a meeting of the New Jersey Foundrymen's Association, Military Park Hotel, Newark, N. J., Oct. 15. Walter Dickinson and Sol Stieglitz of the Newark office, NPA, were the principal speakers. The meeting was well attended by operators of both ferrous and nonferrous foundries. A. E. Winstead, Moore Bros. Co., Elizabeth, N. J., presided in the absence of association president, H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J.

An unexpected guest was D. Frank O'Connor, O'Connor Foundry, Hac-

(*Continued on page* 185)

Radiograph of Locomotive Cylinder Liner

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(*Continued from page* 182)

kettstown, N. J. Mr. O'Connor has recently been appointed chief of the program section, Foundry Branch, Copper Division, NPA, Washington, and was called upon for remarks.—*B. K. Price*

Wisconsin

AT THE Oct. 12 meeting of Wisconsin Chapter of the AFS, more than 200 members and guests were present to hear O. J. Myers, technical director, Foundry Products Division, Archer-Daniels-Midland Co., Minneapolis. His talk was entitled "The Correlation of Research with Foundry Coreroom Practices." Following this talk the film "The ADM of Cores," was shown. It gives information on core sands, binders and coremaking procedures. Mr. Myers led a question-and-discussion period following the motion picture.

Immediately after dinner, as the coffee talk presentation, a motion picture showing the four seasons of the year at Sun Valley, Idaho, with Lowell Thomas as narrator, was presented through the courtesy of Union Pacific Railroad.—*John E. Hubel*

Southern California

FOUNDRY Refractories" was the topic considered at the Oct. 12 meeting of Southern California Chapter of the AFS at Rodger Young Auditorium, Los Angeles. There were 112 members and guests present.

Principal speaker was R. A. Witschey, ceramic engineer, A. P. Green Fire Brick Co., Chicago. Mr. Witschey discussed the general application of refractories in cupolas, electric and reverberatory types of melting operations, and ferrous and nonferrous problems in relation thereto. The characteristics and uses of acid, basic, silicon carbide and neutral bricks were covered. Mr. Witschey also stressed the importance of maintaining records on the life of the refractories used, and comparing these with each new purchase of refractories. Supplementing the talk were slides, charts and diagrams.—*Alfred A. Grant III, Grant & Co.*

Northeastern Ohio

OCTOBER meeting of Northeastern Ohio Chapter of the AFS at Tudor Arms Hotel, Cleveland, drew an attendence of approximately 250 to hear Bernard N. Ames, senior metallurgist, U. S. Naval Shipyard, Brooklyn, N. Y., discuss "Shell Molding."

Mr. Ames described some of his experiences in working with the shell molding process. Sand used in the process may vary in fineness from AFS 90 to 230, with a clay content below 3 per cent. Resin content may vary from 5 to 9 per cent by weight of the sand. Mixing time should be about 7 minutes, and a conventional foundry muller with the wheels raised about 1 in. from the bottom may be used. Best results are obtained with alloy cast iron patterns heated to 350-500° F and coated with a mold release agent (usually a silicone-water emulsion, 5 to 10 per cent by volume). Curing the mold for 1 minute at 600° F generally is sufficient.

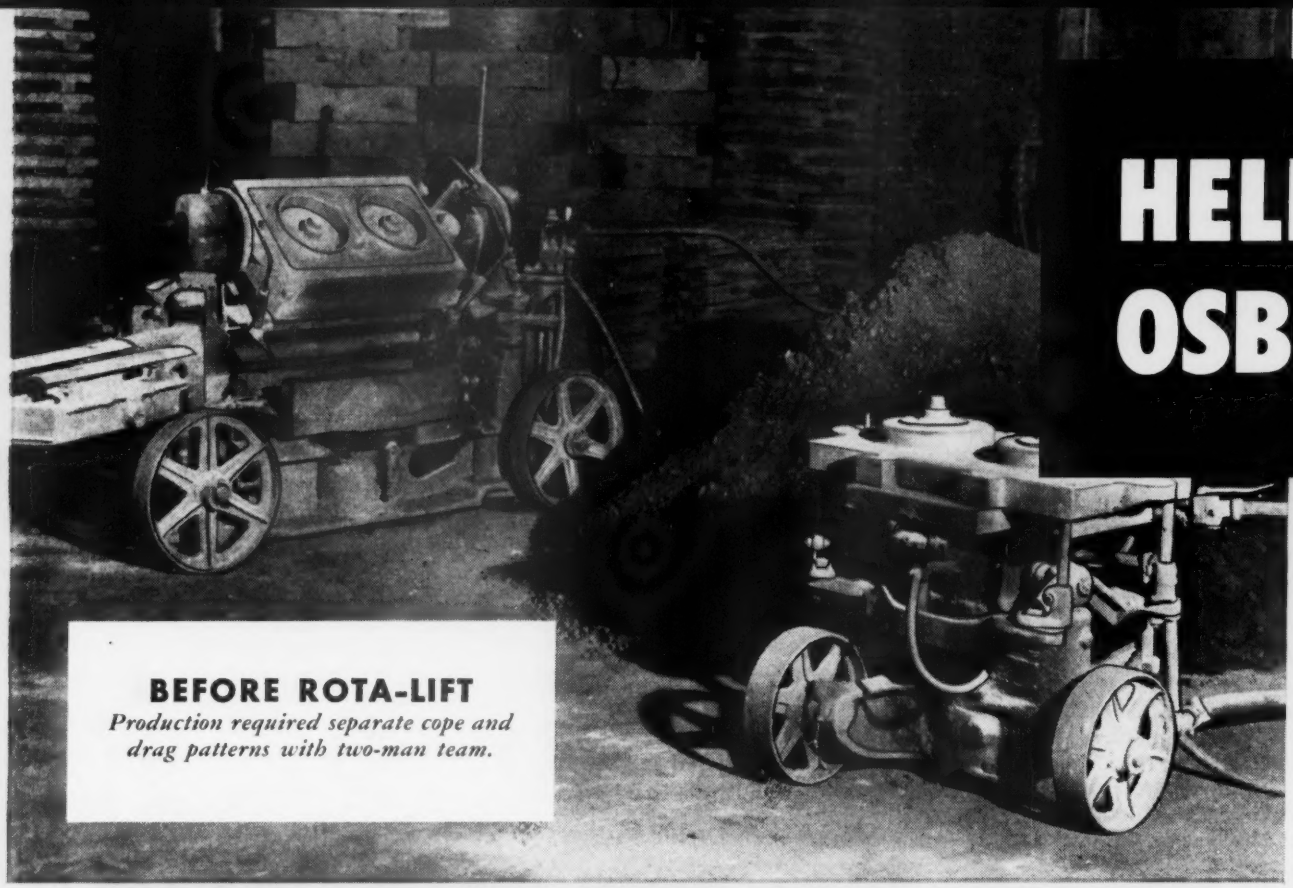
Accepted principles of gating and heading must be followed in this as in other casting processes if castings are to be sound. Gating methods which provide for pouring molds on end are preferable. Best casting surface finish is obtained by bottom gating. A tapered downsprue in a ratio of 4:1 is desirable.

For making cores, Mr. Ames suggested the use of heating units in the corebox and an automatic quick-opening and closing device. Cores thus are cured in the box without the necessity of a separate curing oven. He also said that the use of steel shot as a backing agent for the shell molds does not provide a chilling action.

From the health point of view, shell molding offers a possible respiratory hazard in the handling of

(*Continued on page* 188)

WISCONSIN Chaper of the AFS held its second meeting of the season Oct. 12 with 205 members and guests present. Shown at top is a table group at the meeting. Center, left to right, are: O. J. Myers, Foundry Products Division, Archer-Daniels-Midland Co., speaker of the evening; R. J. Anderson, Belle City Malleable Iron Co., and G. E. Tisdale, Zenith Foundry Co., chapter president. Bottom view was taken at the September 14 meeting. Left to right are: Duane Bosma, Bucyrus-Erie Co., and J. E. Gitzen, Delta Oil Products Co. Photos by courtesy of Walter V. Napp, Delta Oil Products Co.



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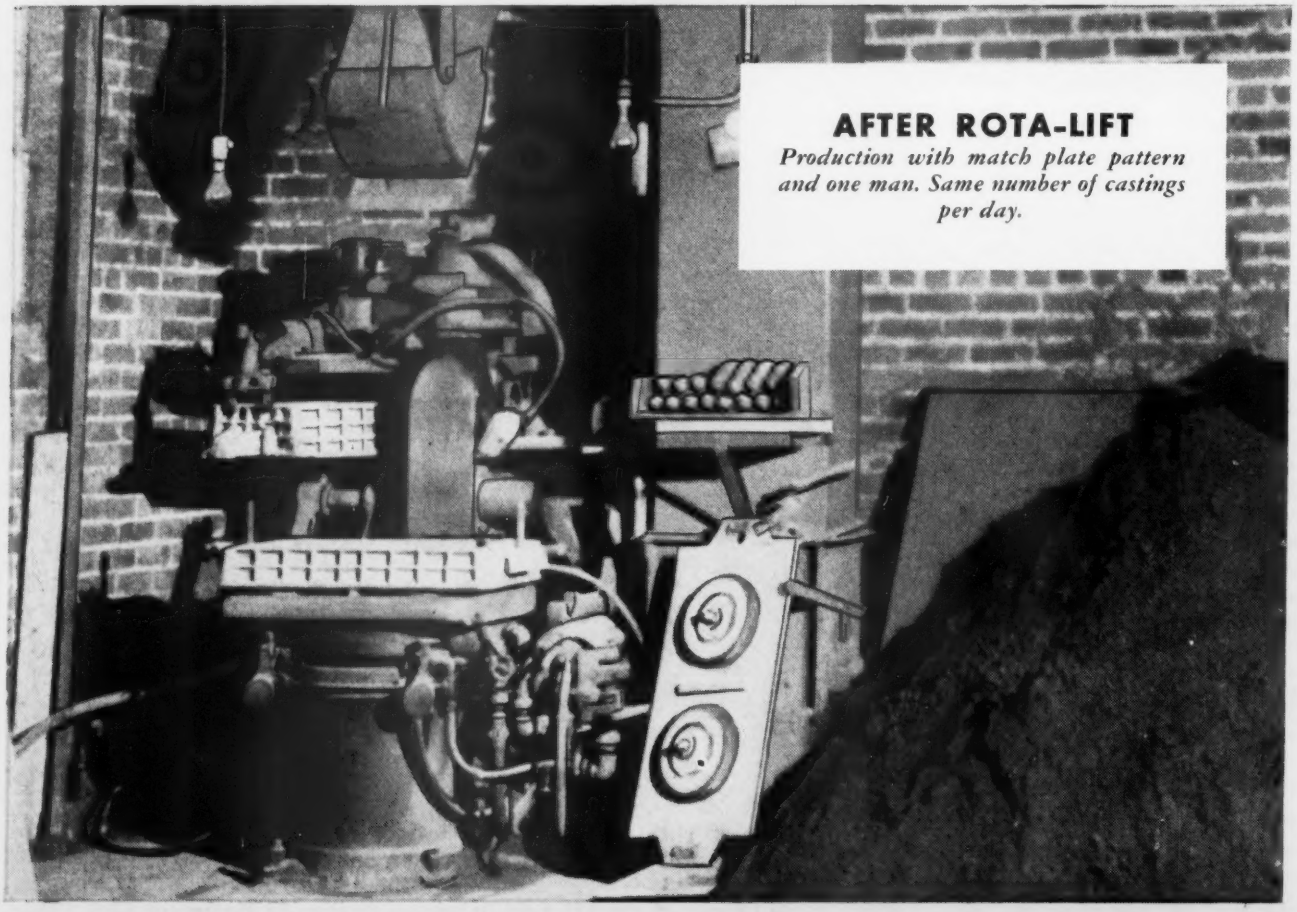

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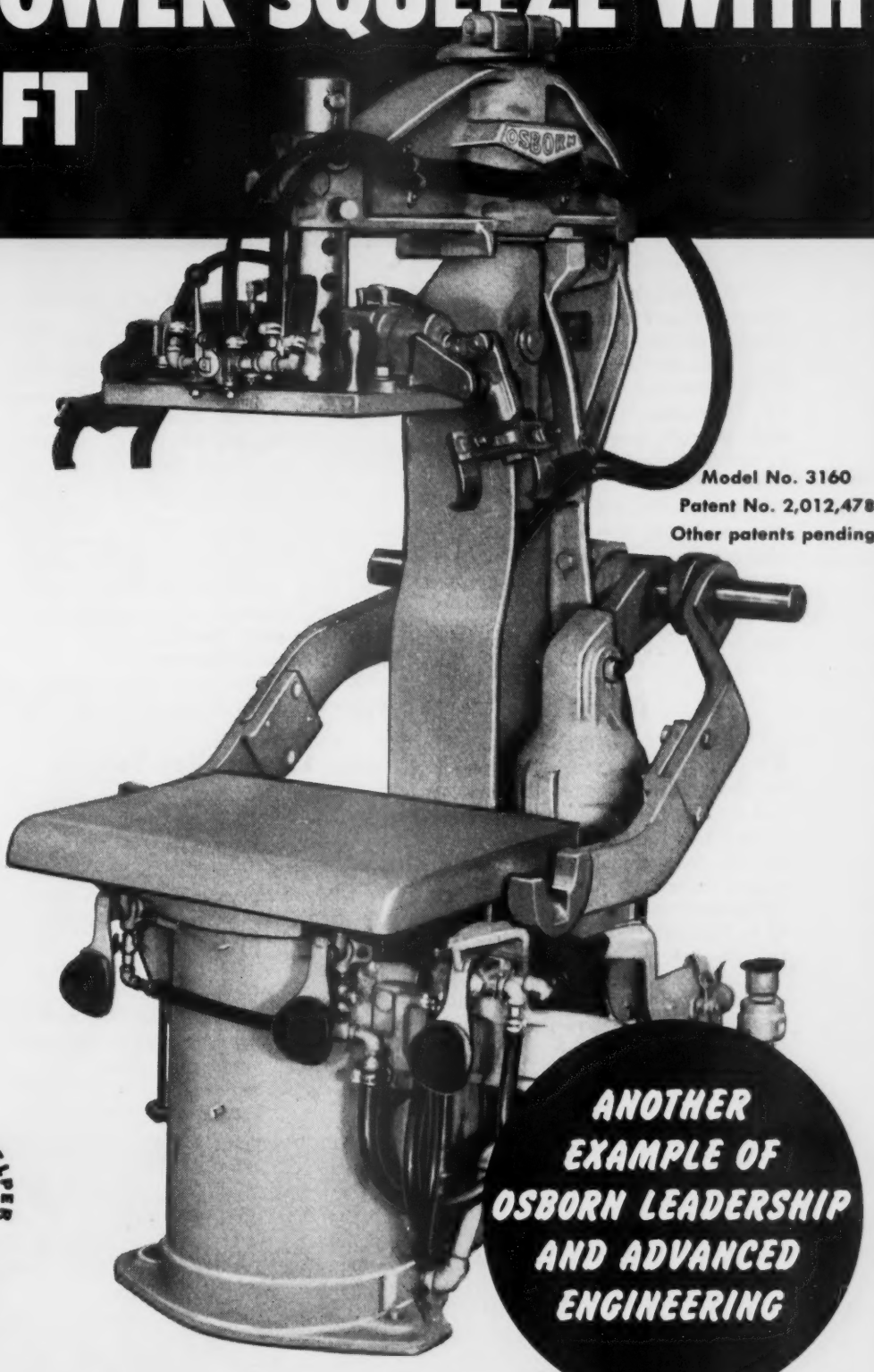

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DETROIT Chapter of the AFS met Oct. 18 at the Detroit Leland Hotel, Detroit. Left to right: Michael Warchol, Atlas Foundry Co., chapter vice chairman, presents set of chapter book ends to Speaker Kenneth Morse, national AFS staff member. Photo by R. Grant Whitehead, Claude B. Schneible Co.

(*Continued from page* 185)
pulverized and fine silica sands and possible contact dermatitis from handling phenolic resins containing hexamethylene-tetramine. Odors emitted by decomposing molds during and after pouroff, however, are acrid but no worse than many other foundry odors.

The patternmaking division saw a film describing the manufacture and application of grinding wheels. Presentation was by J. R. Saunders and J. R. Anderson, local representatives of the Carborundum Co., Niagara Falls, N. Y.—*Robert H. Herrmann.*

Detroit

KICK-OFF meeting of the year was "Past Chairmen's Night" for the Detroit Chapter of the AFS and was held Oct. 18 at the Detroit-Leland Hotel. Jess Toth, Harry W. Dietert Co. and junior past chairman, turned the gavel of authority over to Vaughan C. Reid, City Pattern Foundry & Machine Co. Past chairmen of the chapter present at the meeting were introduced and James C. Mahon who served during the period 1930-32 told of several interesting episodes in the activities of the chapter in those days.

Kenneth M. Morse of the American Foundrymen's Society staff, addressed the group on "Safety, Hygiene and Air Pollution." The program ahead of him and his committee was outlined and it is believed the fruits of their surveys will provide the industry, including the various city code committees, with things to think about.—*R. Grant Whitehead, Claude B. Schneible Co.*

Western Michigan

THE chapter's largest attendance at a technical meeting was recorded at the Oct. 1 meeting of Western Michigan Chapter of the AFS at Cottage Inn, Muskegon Heights, Mich.; 165 were present. The speaker was W. M. Sinclair, technical representative, thermosetting department, Bakelite Division of Union Carbide & Carbon Corp. His topic was "The Shell Molding Process for the Casting of Metals." Ross Shaffer, Lakey Foundry & Machine Co., Muskegon, Mich., and chapter chairman, presided. In his talk, Mr. Sinclair outlined the many possibilities for future development of this new process.

The chapter held its 11th annual stag picnic Aug. 18 at the Highland Golf Club, Grand Rapids, Mich. There were 650 members and guests present to enjoy golf, baseball, horseshoes, the dinner and floorshow. More than 100 door prizes were distributed.—*C. H. Cousineau, Carpenter Bros. Inc.*

Western New York

TO open the current chapter season, Kenneth M. Morse, director of the national AFS safety, hygiene and air pollution program, addressed members of Western New York Chapter of the AFS. Designated "Top Management Night," the meeting was held Oct. 5 at Hotel Sheraton, Buffalo.

Mr. Morse stated that industrial public relations, especially within the immediate community, have been poor. Industrial safety tries to make careless people safe workers and safety conscious. Great achievements have been made in foundry health conditions; however, air pollution is increasing in importance and its control is effected by dilution, oxidation, moisture collectors and also through change of plant locations and rezoning. Mr. Morse pointed out that AFS research on the problem of safety, hygiene and air pollution will be guided by the needs of the foundry industry.—*Marve Taublieb, Frederic B. Stevens Inc.*

No. Illinois and So. Wisconsin

MODERN Brass and Bronze Foundry Practice" was the subject discussed by Fred L. Riddell, research metallurgist, H. Kramer & Co., Chicago, at the Oct. 9 meeting of the Northern Illinois-Southern Wisconsin Chapter of the AFS. The meeting was held at Faust Hotel, Rockford, Ill.

Mr. Riddell explained the difference between ingot and virgin metal and described the standard methods of manufacturing ingot. He emphasized the importance of controlling furnace atmosphere in melting and the use of the pyrometer in controlling pouring temperature. Good practices in gating and risering, sand, and molding must be followed to produce quality castings.

The meeting was concluded with the showing of "The ADM of Cores" presented through the courtesy of the Foundry Products Division, Archer-Daniels-Midland Co.—*J. S. Zabel, Zabel Foundry Sales Inc.*

Central Ohio

APPROXIMATELY 150 members and guests were present at the Oct. 8 meeting of Central Ohio Chap-
(*Continued on page* 191)

WESTERN MICHIGAN Chapter of the AFS held its annual stag picnic Aug. 18 at Highland Golf Club, Grand Rapids, Mich. Left to right are: H. F. McKay, McKay Industrial Sales, Grand Rapids; William Tuthill and James Vandermullen, American Seating Co., Grand Rapids; John Van Haver, Sealed Power Corp., Muskegon, Mich., chapter treasurer, and Fred J. DeHudy, Centrifugal Foundry Co., Muskegon, secretary. These men were on the picnic committee

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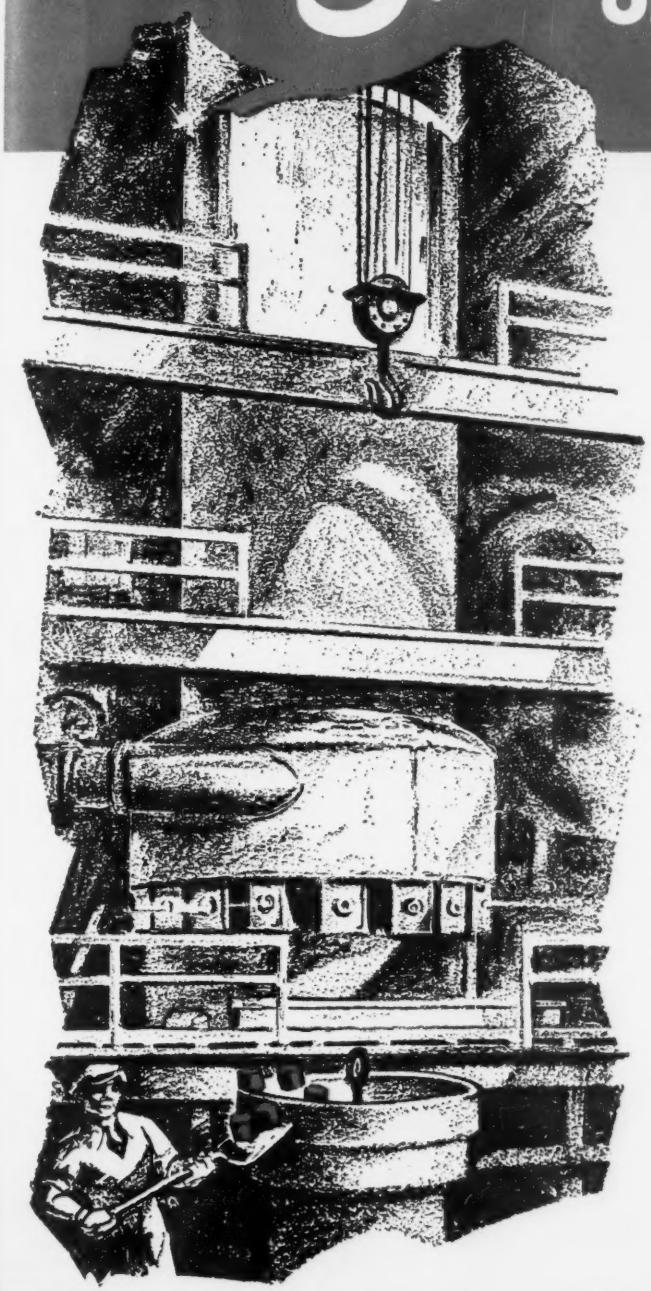

You gain the benefit of positive analysis control when you use Ohio Ferro-Alloys Briquets for silicon, manganese and chrome addition to the cupola. Their use as regular practice allows a wide latitude in making up the charge from available pig iron and scrap.

THE FOLLOWING ARE AVAILABLE

Kind of Ohio Ferro-Alloys Briquet	Color	Contained Alloy
Silicon	black	Two Sizes { 1 lb. Silicon / 2 lb. Silicon
Silico-Manganese	yellow	½ lb. Silicon and 2 lb. Manganese
Manganese	red	2 lb. Manganese
Chrome	green	2 lb. Chromium

Important, too, is the knowledge that you can count on a dependable source of supply for these products. Our increased production capacity will permit us to meet the growing demands from old and new customers. We invite your inquiry.

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LOW CARBON FERRO - CHROME SILICON
HIGH CARBON FERRO - CHROME
FERRO - MANGANESE • BOROSIL • SIMANAL

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SILICO - MANGANESE

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SAN FRANCISCO AREA — Pacific Graphite Company, Inc., Oakland 8, California.

LOS ANGELES AREA—Snyder Foundry Supply Company, Los Angeles 11, California.

MINNEAPOLIS AREA — Foundry Supply Company, Minneapolis, Minnesota.

MEXICO — Casco S. de R. L., Apartado Postal 1030, Calle Atenas 32-13, Mexico, D. F., Mexico.

SALES AGENTS, NO WAREHOUSES:

NORTHWEST AREA — E. A. Wilcox Company, Arctic Building, Seattle 4, Washington; Phone Mutual 1468.

BIRMINGHAM DISTRICT—Schuler Equipment Company, First National Building, Birmingham, Alabama.

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Chicago Detroit Pittsburgh Tacoma Seattle
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ROTO-CLONE Type N Arrangement D . . . and cutaway showing operation of water curtain.

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WET TYPE COLLECTORS!

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1. Efficiency—better than 98% on small micron particles even in heavy concentrations. This is the daily operating record of scores of Type N and Type W ROTO-CLONES now servicing many kinds of foundry operations.

2. Low Cost—a ROTO-CLONE wet collection system costs no more than other dust collectors of comparable efficiency. However, its small space requirements and factory method of assembly reduce installed costs. Operating features also reduce maintenance. The ROTO-CLONE system of bringing the dust to the water makes effective use of every gallon supplied.

3. Uniform Air Delivery—the exclusive ROTO-CLONE engineering features supply constant air volumes and continuous efficiency dust control.

4. No Secondary Dust—ROTO-CLONES eliminate rehandling and disposal of dry dust. Dust is collected in sludge form within the self-contained unit and may be disposed of in several ways. For one . . . it may be sluiced, either intermittently or continuously.

The principle applications for wet-type collectors in the foundry field are • Shake-outs • Sand Conditioning Systems • Core Grinding • Abrasive Cleaning • Tumbling Mills • Electric Melting Furnaces.

For complete information on the many ROTO-CLONE types, sizes and applications call your nearby AAF representative or write for Engineering Bulletin No. 270A.

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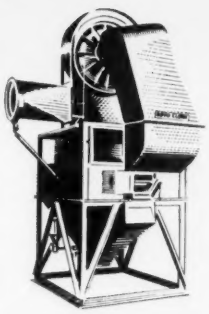
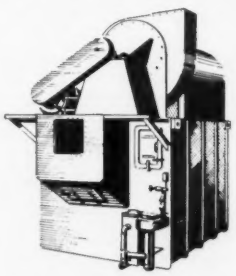


Type W ROTO-CLONE



Type N ROTO-CLONE Arrangement B

American Air Filter
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(*Continued from page* 188)

ter of the AFS at the Chittenden Hotel, Columbus, O. Richard Herold, Borden Co., New York, spoke on "Shell Molding and Plastic Binders."

Mr. Herold discussed fundamentals of shell molding, explaining that it had been used successfully in casting all metals to tolerances of 0.002 to 0.003-in. The process yields castings which require little or no cleaning or machining. Since only a shell of sand with a plastic binder is used, there is little material to handle and labor is reduced to a minimum. The speaker believes that the process holds great promise and that it may permit foundries to recapture work lost to other fabricating methods. Those present were greatly interested in examining in detail the photos, samples of molds and the castings produced from them which were exhibited by Mr. Herold.

A short movie of the chapter's picnic was presented by Wilfred H. White.—*Wilfred H. White, Jackson Iron & Steel Co.*

Central Michigan

APPROXIMATELY 100 members and guests of Central Michigan Chapter of the AFS were present Oct. 17 at Hart Hotel, Battle Creek, Mich., for the "Management Night" program. Thomas Lloyd, Albion Malleable Iron Co., Albion, Mich., chapter chairman, presented a brief report on the progress made in installing a course on foundry practice at the Battle Creek Vocational School. Lachlan Currie, Gale Mfg. Co., Albion, then introduced Frederick Wickert, professor of psychology at Michigan State College, who spoke on the selection of supervisory personnel.—*Richard Dobbins, Albion Malleable Iron Co.*

Twin City

MORE than 100 members and guests were present at the Oct. 9 meeting of Twin City Chapter of the AFS to hear T. R. Eggert, assistant technical and research director, Steel Founders' Society of America, Cleveland, speak on "Cast-Weld Construction and Composite Fabrication."

The speaker first spoke on the mechanics of welding steel castings. He pointed out that a preheat of the casting for welding is necessary; the temperature of this heating operation depends on carbon content of the steel, thickness of the section to be welded, and complexity of the casting. Also, in his experience, lime-coated, low-hydrogen electrodes are the best for welding steel castings. He then described the importance of composite fabrication and cast-weld construction to steel foundrymen. It is through this means that certain steel constructions can be made better and cheaper than by complete casting or welding.—*J. D. Johnson, Archer-Daniels-Midland Co.*

Quad City

WIDESPREAD interest in new foundry developments was evident at the Oct. 15 meeting of Quad-City Chapter of the AFS. W. F. Rose, senior foundry engineer, Borden Co., New York, spoke on "Recent Developments in Shell Molding." More than 125 members and guests, some from other chapters and from more distant foundry centers, attended the meeting held at Fort Armstrong Hotel, Rock Island, Ill.

Mr. Rose outlined the methods used in producing shell molds using slides to illustrate procedures. The speaker then brought out the disadvantages as well as the advantages of the process. The numerous possibilities and advantages of using the shell molding process in the coreroom also were emphasized. On display at the meeting were shells and castings produced by this method. Ted Burkland, foundry metallurgist, Deere & Co., served as technical chairman. —*Eric Welander, Union Malleable Iron Works*

Metropolitan

BEFITTING the start of a new season, William M. Ball Jr., R. Lavin & Sons Inc., Cincinnati, spoke on "Essentials Required To Make Good Castings" at the Oct. 1 meeting of Metropolitan Chapter of the AFS. There were 130 members and guests

CENTRAL MICHIGAN Chapter of the AFS met at the Hart Hotel, Battle Creek, Mich., Oct. 17, to celebrate management night. At top, left to right, are the speaker, Frederick R. Wickert, professor of psychology, Michigan State College; Lauchlin Currie, Gale Mfg. Co., and William Robb, A. P. Green Fire Brick Co., chapter director. Left to right in lower view are: J. F. Secor, Hill & Griffith Co., chapter director; Ralph Brooks, Brooks Furnace Co., and W. W. Stout, Marshall Foundry. Photos by courtesy of Jack Eggleston

present at the Essex House, Newark N. J., and D. Frank O'Connor, chapter chairman, presided.

Appealing to the practical foundryman, Mr. Ball emphasized the fundamentals of good foundry practice which he referred to as the three M's—machines, materials and men. Of these three, he believes the handling of men deserves the most attention. Preventing defective castings, he said, can be accomplished more by doing each part of the job correctly than by looking for new developments or "cure-alls". For example, he suggested deciding on the method of molding before the pattern is made so that the pattern will be suited to the molding method; having flasks of correct size and in good condition; and paying a higher price if necessary for sand having the properties required for the job.—*William T. Bourke, American Brake Shoe Co.*

Gates and Heads

(*Concluded from page* 109)

Fig. 16, from the paper by Duma and Brinson referred to earlier, and Fig. 12, from Briggs' *Metallurgy of Steel Castings*, show the application of the partial reversal method to the production of stockless anchor shanks weighing some 20,000 lb. It will be noticed that the casting shown in these illustrations is almost made to order for the application of this method since its tapering form helps greatly to promote progressive solidification from end to end. In pouring this piece, the feeding tendency was increased by filling the heads from the top after the casting itself was poured completely, and by using a liberal layer of "pipe eliminator" to keep the heads from freezing at the top as long as possible.

Though it is still used to some extent, the partial reversal method has in many cases been replaced by the use of atmospheric pressure heads attached at the side or end of the casting. As will be explained later, risers of this kind accomplish much the same result as partial reversal, and are far easier to apply.

(*To be continued next month*)

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10. W. H. Johnson and W. O. Baker, "Gating Systems for Metal Castings," FOUNDRY, October, 1948, p. 68.
11. J. A. Duma and S. W. Brinson, "Application of Controlled Directional Solidification to Large Steel Castings", *Transactions*, AFS, Vol. 48, 1940, p. 225.
12. George Batty, "Controlled Directional Solidification," *Transactions*, AFS, Vol. 42, 1934, p. 262.
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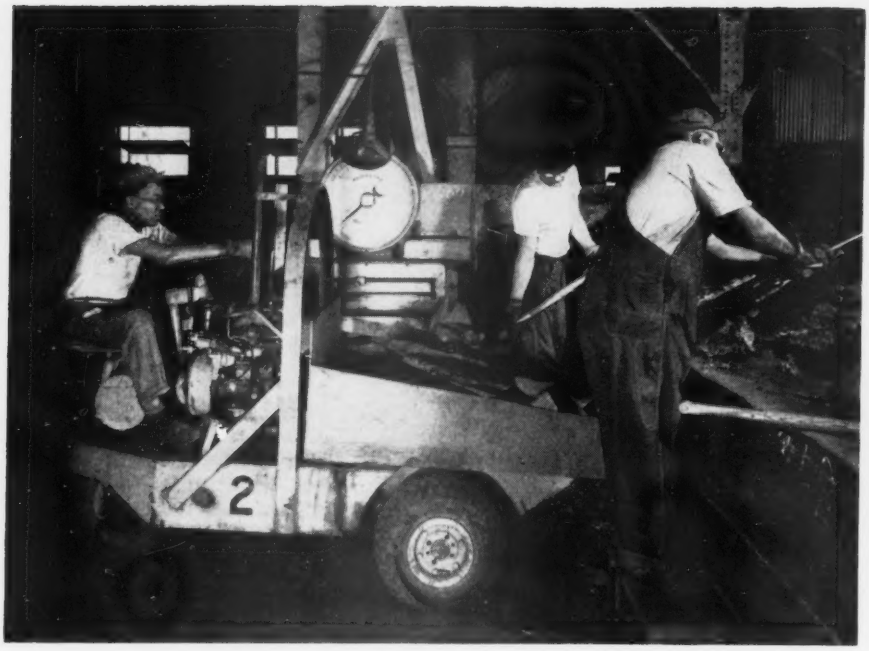

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A FOUNDRY FABLE

By HAROLD E. HENDERSON

ONCE upon a time—oh, ever so long ago,—a young man, whom we shall call Joe Molder, was ramming sand after the manner of his trade. Joe was earning a good living, but he wasn't entirely happy; so one day in a moment of inspiration, he decided that he would go into business for himself. He would no longer work for others, doing all the hard work, while receiving only a daily pittance as reward. He would become his own boss!

Accordingly he burned the midnight oil, studying technical books and papers pertaining to the foundry business. He saved his money; borrowed some from friends; and more perhaps from a banker (who had a moment to spare between visits to his psychiatrist).

Joe's ambition was not to be thwarted. Opportunity nodded her beautiful head in his direction. She even favored him with a knowing wink!

Now it so happened just at this opportune moment that a certain small foundry had gone broke—a simple case of bad judgment, lack of know-how, old fogyism, etc. Joe jumped at this chance of a lifetime!

The contracts were drawn up, papers and promises were signed and sealed, the shop was renovated from office to coke pile—and again the sounds of chipping hammers, creaking cranes, and molder's profanity were resurrected in a veritable symphony of praise to industry.

Orders were plentiful. Activity was feverish. Success was assured—and then, things began to happen!

Ancient machines quite suddenly got tired and groaned to a stop, gasping for costly repairs. That beautiful stream of golden metal proved to be oxidized, or too hard, or too soft, or too weak, or too—something else; which caused the customer to speak in most disparaging terms with reference to our hero's product. The customer was very unhappy—so was Joe!

Sand failure reared its ugly head. There was abundant evidence of blow, scab, buckle, crush, cut, wash, rattail, and a few other trifling annoyances, which, though not terribly important, did cause some nightly tossing on the pillow for Joe.

Some customers complained of casting defects revealed only after

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By introducing chromium copper into copper—for the production of copper castings and drawn copper—the results are alloys of greater strength, hardness, electrical and thermal conductivity. These elements make them superior to pure copper in all applications which require conductivity, wear resistance and resistance to softening under continuous heat.

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Chromium	4.0—6.0%
Total impurities	0.8%
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Chromium	8.0—11.0%
Total impurities	1.0%
Copper	Balance

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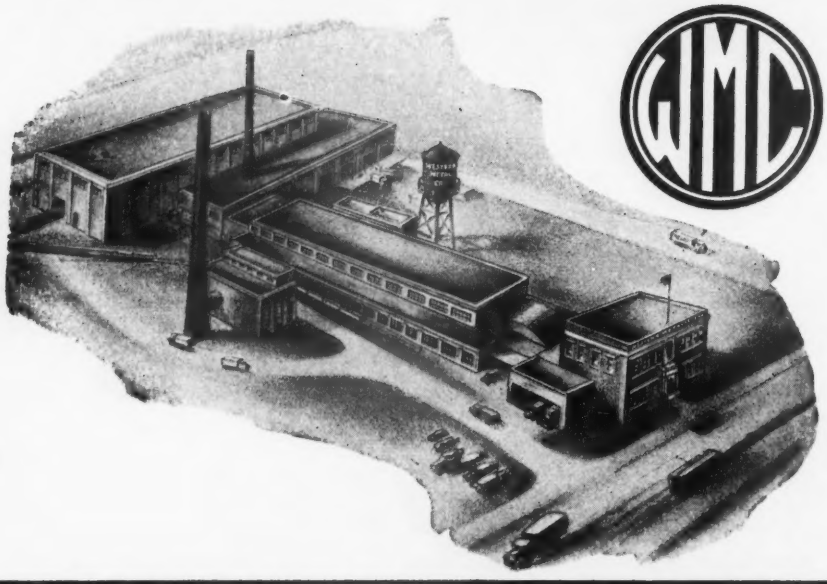

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We produce Brass, Bronze and Aluminum Ingots to your exact specification and can provide complete laboratory service as well as field metallurgists to help you produce the quality castings necessary to insure the standards of today's requirements. We have built our reputation on quality and service. . . . it will pay you to investigate Western.

WRITE FOR NEW BULLETIN "F"

Here in one booklet is a complete summary of tables including A.S.I.M., U. S. Federal, U. S. Navy and S.A.E. specifications as well as nonferrous ingot metal alloys for all various modern industrial classifications. This bulletin will be of utmost value to you as will an acquaintance with a truly reliable ingot manufacturer, for the successful operation of your foundry.

WESTERN METAL COMPANY
3201 SOUTH KEDZIE AVE. CHICAGO 23, ILLINOIS

SMELTERS AND REFINERS OF BRASS AND ALUMINUM INGOTS

costly machine work had been wasted. Joe promised to cover these costs. Others insisted that the pound-price was too high—Joe lowered it! Labor asked for more money—Joe came through!

But—why should we dwell endlessly on the sickening details which led to the sheriff's second lock on the door?

As our story ends, we find Joe back at his rammer, a wiser Joe indeed. He has learned that the foundry is "a good place to *work*" but not necessarily to *own!*

Application: The mahogany desk in the Boss' office should never be without a supply of aspirin!

Studies Wages of Molders And Coremakers

Average hourly earnings of makers and molders in 25 l ferrous foundry areas ranged fron $1.32 to $2.34 in June, 1951, according to the U. S. Department of Labor's Bureau of Labor Statistics. Birmingham where coremakers and floor molders earned $1.32 and $1.33, respectively, was the only city in which wages for these occupations were less than $1.58 an hour. In three-fifths of the areas studied, earnings in these occupations averaged from $1.75 to $2 an hour and in about one-fourth of the areas, hourly earnings averaged $2 or more.

Average earnings in ferrous foundries generally ranked highest in the Great Lakes region. Between the summer of 1950 and June, 1951, average earnings increased from 5 to 10 per cent. A tenth of the increases amounted to less than 5 per cent, and a slightly larger proportion to more than 15 per cent. About a fourth of the increases ranged from 10 to 15 per cent.

Film Shows Modern Steel Foundry Operations

Lebanon Steel Foundry, Lebanon, Pa., has produced a 37-minute, 16-mm sound-color film covering modern steel foundry operations and techniques. Entitled "Steel With a Thousand Qualities," it portrays the functions carried out in planning and producing a sample casting, preparatory to full-scale quantity production. Copies for showing before industrial and manufacturing groups, technical, engineering and scientific societies, colleges, and similar educational institutions are available free from Modern Talking Picture Service Inc., 45 Rockefeller Plaza, New York 20.

ML Aluminum Alloy

(*Concluded from page* 113)

confirmed the opinion that the alloy is easily cast, and that gates and risers would be placed in the same manner as for Y alloy.

Creep and Stress Rupture Properties—The creep properties of Y alloy (142-T61) are slightly better than ML (as-cast or annealed) at 400°F, but at 600°F the ML alloy has the superior creep resistance. At a minimum creep rate of 0.0002%/hr, 142-T61 will support a load of 2500 psi while ML alloy will support a load of approximately 4100 psi at 600°F.

Stress rupture tests indicate that ML alloy will support a load of 6600 psi for 1000 hr at 600°F, and by extrapolation, a load of 5300 psi for 10,000 hr at that temperature. Castings which may become overheated in service in the 650° to 800°F range follow a stress rupture curve at 600°F that is parallel to one that has been kept under 650°F, a critical point, but is approximately 500 psi less. Thus, an overheated ML alloy casting will support a load of 6100 psi for 1000 hr in stress rupture test at 600°F.

A summary of the properties of ML aluminum alloy is given in Table I. The alloy has tensile, creep, and stress rupture properties at 600°F, approximately 35 per cent higher than other alloys which have been used for elevated temperature service. This should be an aid to designers of aircraft and engine parts in their efforts to produce new and better aircraft.

Book Review

Fundamentals of Supervision, by Charles A. Harad, cloth, 224 pages, 8 x 10½ in., published by Delmar Publishers Inc., Albany 1, N. Y. Price $3.75. Accompanying *Conference Leader's Guide* (for above). Price $2.

A practical approach to the problems of the supervisor is contained in this well organized training material, written specifically for the supervisor or foreman. Text contains units of instruction outlining objectives, discussion content based on actual shop problems, and assignments. Problems dealt with include: Getting increased production; reducing waste; handling grievances; handling absenteeism; developing initiative, etc.

The *Conference Leader's Guide* includes specific and detailed methods and procedures for successful presentation of each unit of the text. Suggestions are given for stimulating discussion, emphasis and summarizing of main points, and plan of questioning.

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NATIONAL BENTONITE

Memo to Men who do the Buying:

When the men in the shop have been using National Bentonite to bond their molds, and have learned to rely on its consistently high quality—well, they're apt to be irritated if that good bentonite runs out. Moral: make sure you have an adequate supply of National Bentonite. Then the men find it easier to make molds with both high green strength and good hot strength, molds that reduce the hazard of gas holes and blows. Result: Better castings with finer finish and fewer rejects. Everybody happy!

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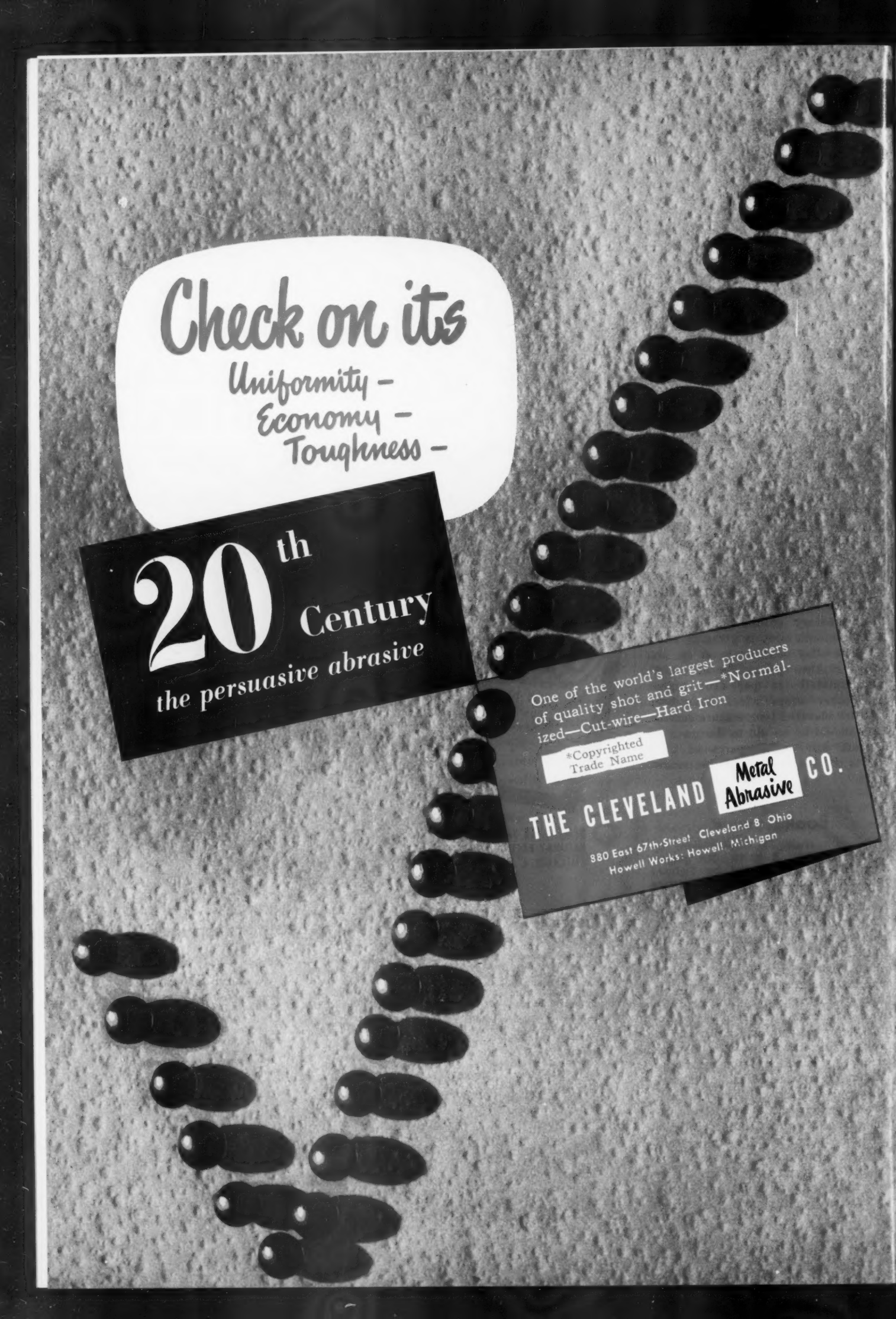
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Foundry STATISTICS

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1949	713,330	371,214	.....
1950			
Aug.	86,021	50,019	132,374
8 mo.	571,382	315,347	.....
Sept.	82,479	46,927	152,583
Oct.	89,968	50,157	160,278
Nov.	85,163	48,670	180,099
Dec.	91,510	51,091	194,950
Total	920,502	512,192	.....
1951			
Jan.	92,508	54,817	234,060
Feb.	88,950	54,915	255,347
Mar.	101,667	60,265	267,169
Apr.	97,276	57,554	276,463
May	100,800	61,373	274,954
June	94,376	57,176	258,144
July	76,826	45,072	263,017
Aug.	90,727	57,164	249,273
8 mo.	743,130	448,336	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled Orders[2]
1949	724,053	654,444	37,311	.....
1950				
Aug.	94,013	85,948	4,258	52,513
8 mo.	616,627	557,318	31,301	.....
Sept.	95,641	87,111	4,630	58,673
Oct.	105,746	96,911	5,064	66,560
Nov.	103,694	93,607	5,776	67,931
Dec.	100,548	90,513	5,985	69,569
Total	1,016,180	918,883	52,756	.....
1951				
Jan.	102,643	92,171	6,363	77,580
Feb.	96,946	87,667	5,427	75,967
Mar.	110,887	100,221	6,405	79,766
Apr.	101,506	91,852	5,802	82,711
May	105,438	95,049	5,986	84,002
June	98,559	88,818	5,358	83,518
July	76,551	69,334	4,064	85,837
Aug.	94,443	84,720	5,097	84,821
8 mo.	786,973	709,832	44,502	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Shipments—Die	Unfilled Orders[2]
1949	304,409	106,825	102,908	87,812	.....
1950					
Aug.	39,852	14,117	12,682	12,207	82,564
8 mo.	270,458	91,878	86,751	85,622	.....
Sept.	42,061	14,369	13,085	13,594	89,723
Oct.	47,278	15,994	14,893	15,408	102,938
Nov.	46,816	16,099	14,040	15,715	67,931
Dec.	45,999	15,675	15,052	14,322	104,380
Total	452,610	154,013	143,821	144,661	.....
1951					
Jan.	42,538	14,401	14,554	12,641	93,264
Feb.	40,785	14,106	13,082	12,852	94,581
Mar.	42,204	15,900	12,771	12,677	100,453
Apr.	40,242	14,455	12,901	12,079	106,077
May	40,487	14,798	13,400	11,692	112,638
June	35,961	13,853	10,323	10,850	112,760
July	27,426	10,739	7,142	8,693	119,461
Aug.	35,531	14,128	10,922	9,526	117,888
8 mo.	305,174	112,390	95,095	91,010	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1949	9,364	8,781	....
1950			
Aug.	1,147	1,078	4,855
8 mo.	6,693	6,253	....
Sept.	1,231	1,154	4,942
Oct.	1,354	1,297	5,573
Nov.	1,508	1,434	6,928
Dec.	1,528	1,444	6,958
Total	12,314	11,582	....
1951			
Jan.	1,840	1,739	8,616
Feb.	1,907	1,801	10,878
Mar.	2,156	2,058	12,196
Apr.	2,267	2,161	12,191
May	2,334	2,206	12,867
June	1,758	1,642	14,331
July	1,676	1,557	15,528
Aug.	2,270	2,135	16,095
8 mo.	16,208	15,299	....

Foundry Production Workers

Estimated Number

	Aug. 1951	July 1951	Aug. 1950
Gray Iron	156,000	155,500	144,600
Malleable	28,200	27,500	24,500
Steel	64,600	63,100	46,300
Nonferrous	91,000	88,400	81,300

Average Weekly Earnings

	Aug. 1951	July 1951	Aug. 1950
Gray Iron	$68.31	$68.48	$66.07
Malleable Iron	71.43	69.44	65.76
Steel	76.25	74.68	65.99
Nonferrous	73.29	71.94	66.28

Average Weekly Hours

	Aug. 1951	July 1951	Aug. 1950
Gray Iron	41.2	41.4	42.6
Malleable Iron	41.7	40.8	41.7
Steel	43.3	42.6	41.9
Nonferrous	41.5	40.9	41.5

Labor Turnover Rate (July)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	4.2	5.2	2.8	1.6
Malleable Iron	7.2	6.2	5.3	0.05
Steel	6.1	4.8	3.7	0.1
Nonferrous	3.6	4.8	2.6	1.4

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

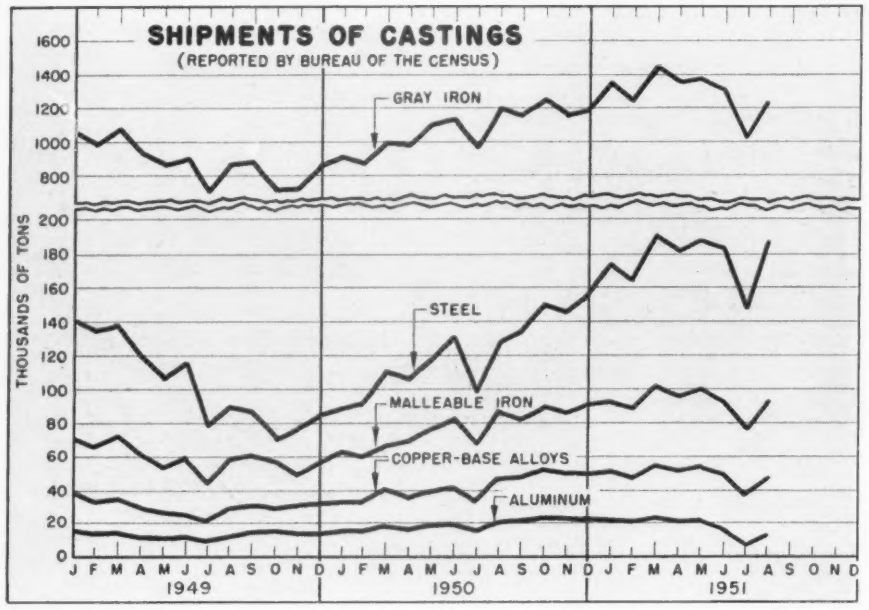
	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Chilled Railroad Car Wheels—For Sale	Pressure Pipe & Fittings—Total[3]	Soil Pipe & Fittings—Total[3]	Unfilled Orders[2] Total
1949	10,549,284	5,521,441	6,624,420	2,675,411	1,776,242	759,860	555,569	493,117	1,029,743	563,310	.....
1950											
Aug.	1,201,569	677,134	747,046	335,868	199,770	92,340	52,508	46,681	131,127	71,118	1,670,380
8 mo.	8,148,677	4,221,200	5,122,981	2,049,549	1,479,678	666,412	334,991	295,023	736,670	474,646	.....
Sept.	1,159,340	648,966	722,667	325,019	203,191	94,968	44,707	40,304	121,556	67,119	1,794,118
Oct.	1,254,901	700,512	792,764	364,607	220,821	100,082	46,516	41,023	119,105	75,695	1,839,866
Nov.	1,160,770	656,745	733,570	343,073	194,271	85,057	44,382	40,068	115,465	73,082	1,930,176
Dec.	1,181,974	652,929	745,766	333,033	210,700	98,071	43,667	39,984	111,066	70,775	2,012,480
Total	12,905,562	6,880,352	8,117,748	3,415,281	2,308,661	1,043,590	514,074	456,402	1,203,762	761,317	.....
1951											
Jan.	1,364,311	762,407	875,437	405,863	228,824	103,475	56,046	49,065	131,779	72,225	2,297,705
Feb.	1,234,226	684,928	811,724	369,932	193,648	91,598	49,423	43,967	117,141	62,290	2,391,843
Mar.	1,440,149	818,473	920,802	427,162	231,853	114,858	62,282	57,241	144,620	74,592	2,389,659
Apr.	1,363,041	766,735	880,381	403,619	217,970	106,417	61,993	54,002	134,302	68,395	2,336,926
May	1,396,236	796,053	897,913	418,950	225,129	112,145	65,721	57,485	139,854	67,619	2,228,596
June	1,308,987	742,794	847,024	395,329	216,620	108,042	58,620	52,700	121,851	64,872	2,162,152
July	1,028,812	568,126	653,656	301,749	200,764	97,575	40,792	35,202	88,217	45,383	2,208,116
Aug.	1,218,832	697,952	779,838	378,042	222,721	109,257	50,127	44,507	115,284	50,862	2,169,556
8 mo.	10,354,594	5,837,478	6,666,775	3,100,646	1,747,529	843,367	445,004	394,169	993,048	516,238	.....

Steel Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[2] Total
1949	1,250,460	865,297	232,976	944,232	659,454	223,310	299,270	205,843	9,666	.....
1950										
Aug.	128,369	94,413	24,922	92,197	70,721	22,952	36,172	23,692	1,970	329,944
8 mo.	875,063	614,531	141,188	640,715	456,542	129,325	234,348	158,989	12,853	.....
Sept.	134,574	96,738	25,295	98,523	74,052	23,992	36,051	22,686	1,303	427,969
Oct.	149,558	109,660	30,048	112,704	85,157	28,493	36,854	24,503	1,555	521,846
Nov.	145,929	108,263	30,775	110,476	84,316	29,245	35,453	23,947	1,530	537,666
Dec.	155,258	113,692	34,061	118,744	88,552	32,160	36,514	25,140	1,901	554,187
Total	1,459,382	1,042,884	261,357	1,081,162	788,619	243,215	379,220	254,265	18,142	.....
1951										
Jan.	174,056	124,002	42,805	135,086	98,197	37,790	38,970	25,805	5,015	675,385
Feb.	163,976	117,156	42,565	126,293	93,461	36,793	37,683	23,695	5,772	706,989
Mar.	190,665	134,184	44,196	148,884	107,745	39,492	41,781	26,439	4,744	779,717
Apr.	181,908	129,059	41,545	139,948	102,367	37,553	41,960	26,692	3,992	846,947
May	189,232	131,102	39,845	143,201	101,363	35,511	46,031	29,739	4,334	881,702
June	184,424	181,219	42,337	141,538	103,090	38,200	42,886	28,129	4,137	895,054
July	147,251	100,141	27,585	111,964	78,034	24,516	35,287	22,107	3,069	929,978
Aug.	186,123	128,981	41,763	138,379	99,732	36,086	47,744	29,249	5,677	944,211
8 mo.	1,417,635	995,844	322,641	1,085,293	783,989	285,941	332,342	211,855	36,740	.....

[1] Source: Bureau of the Census. [2] All cast iron pipe is shipped for sale. [3] For sale only.



Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1950	1951
Jan.	159.3	668.0
Feb.	113.1	638.6
Mar.	225.2	599.0
Apr.	160.6	490.1
May	294.9	431.7
June	622.7	393.2
July	401.8	390.3
Aug.	693.6	404.5
Sept.	483.8	346.5
Oct.	526.8	....
Nov.	885.5	....
Dec.	526.2	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1949	63,637,429	63,462,233	2,778,868
1950			
Sept.	6,263,214	6,243,584	274,657
9 mo.	52,597,300	53,569,147	.....
Oct.	6,649,935	6,543,428	332,444
Nov.	6,243,970	6,131,733	317,120
Dec.	6,606,464	6,590,823	322,458
Total	72,097,669	72,735,131	3,337,517
1951			
Jan.	6,791,828	6,766,767	330,698
Feb.	6,001,538	6,036,774	293,169
Mar.	6,692,460	6,693,661	299,190
Apr.	6,484,258	6,354,400	356,816
May	6,747,163	6,732,825	368,511
June	6,574,621	6,645,155	330,920
July	6,636,335	6,502,058	301,125
Aug.	6,777,820	6,679,152	303,664
Sept.	6,470,251	6,366,799	271,111
9 mo.	59,176,274	58,777,592	.....

Ingot Brass and Bronze

(Shipments in net tons)

	1950	1951
Jan.	18,874	28,416
Feb.	18,487	27,168
Mar.	22,494	31,997
Apr.	22,118	30,472
May	23,643	33,267
June	25,093	33,817
July	21,609	32,016
Aug.	29,689	25,285
Sept.	28,811	22,285
Total for year	303,563	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1949	377,779	248,679	.....
1950			
8 mo.	339,618	213,416	.....
Total	536,398	341,833	.....
1951			
Apr.	43,513	28,565	101,949
May	44,187	29,092	100,299
June	41,341	28,278	95,174
July	34,064	23,088	85,028
Aug.	37,321	22,985	80,588
8 mo.	324,774	212,920	.....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	All Scrap Purchased	By Types of Furnace: Cupola Total	Cupola Purchased	Air Total	Air Purchased	Electric Total	Electric Purchased
1949	49,281,000	22,922,000	7,968,000	4,175,000	801,000	276,000	4,239,000	2,608,000
1950								
July	4,708,000	2,244,000	669,000	318,000	79,000	28,000	490,000	295,000
7 mo.	34,828,000	16,576,000	5,283,000	2,650,000	564,000	205,000	3,392,000	2,044,000
Aug.	5,202,000	2,454,000	862,000	426,000	108,000	39,000	568,000	327,000
Sept.	5,170,000	2,468,000	819,000	404,000	109,000	40,000	579,000	348,000
Oct.	5,643,000	2,707,000	866,000	437,000	108,000	40,000	643,000	384,000
Nov.	5,293,000	2,598,000	841,000	431,000	107,000	39,000	593,000	364,000
Dec.	5,361,000	2,600,000	803,000	418,000	122,000	44,000	600,000	361,000
12 mo.	61,497,000	29,403,000	9,474,000	4,666,000	1,118,000	407,000	6,385,000	3,828,000
1951								
Jan.	5,975,382	3,010,300	1,009,142	533,705	110,004	41,116	684,484	435,633
Feb.	5,337,562	2,691,692	936,918	492,395	101,233	38,135	627,308	398,814
Mar.	6,187,520	3,100,622	1,064,325	558,833	108,513	39,260	728,786	463,371
Apr.	5,987,947	3,013,527	1,029,069	545,897	103,458	37,973	704,416	457,521
May	6,096,678	3,087,313	1,063,281	568,198	111,914	39,312	734,483	484,878
June	5,693,402	2,847,856	972,949	517,604	108,740	39,454	693,636	462,092
July	5,298,644	2,581,856	747,864	393,254	80,903	29,858	632,782	421,689
7 mo.	40,577,135	20,333,166	6,823,548	3,609,886	724,765	265,108	4,805,895	3,125,998

Pig Iron Production and Consumption

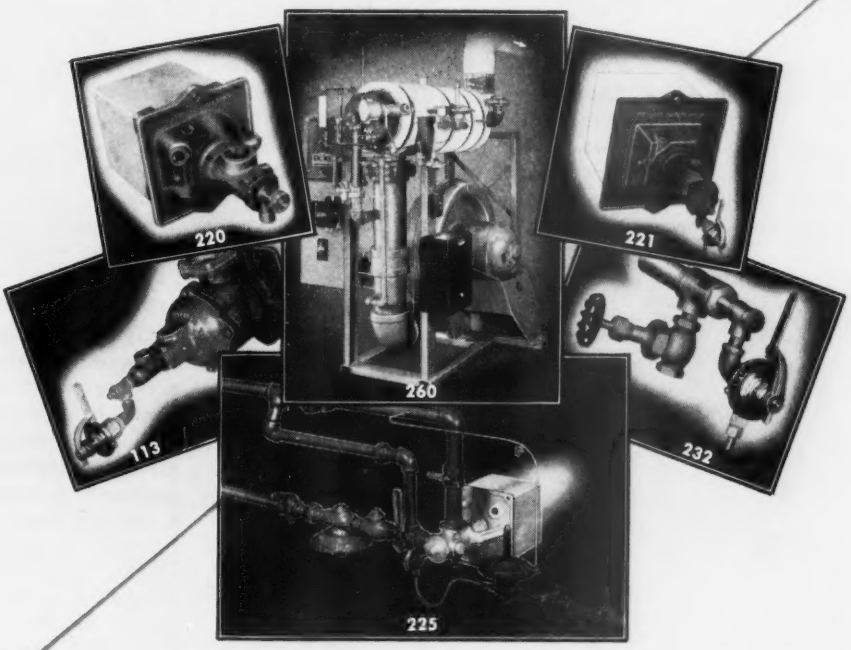
	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1949	53,408.7	2,821.9	2,294.5	41,312.5	6,979.8	47,928	4,510	235	96
1950									
Sept.	5,614.6	244.0	257.2	4,380.9	732.5	5,092	500	26	17
9 mo.	47,826.6	2,119.5	2,148.2	37,441.2	6,116.7	43,312	4,101	214	184
Oct.	5,836.8	284.1	260.6	4,541.2	741.0	5,219	466	31	13
Nov.	5,316.5	277.1	279.1	4,093.7	666.6	4,817	462	30	14
Dec.	5,609.2	264.9	260.2	4,374.4	709.8	5,068	456	34	15
12 Mo.	64,589.1	2,870.4	3,034.2	50,450.5	8,234.0	58,416	5,475	319	326
1951									
Jan.	5,801.7	300.0	233.3	4,529.8	738.6	5,367	542	32	11
Feb.	5,084.8	238.7	226.0	4,007.2	612.9	4,725	492	29	10
Mar.	5,919.3	267.9	276.5	4,647.5	727.5	5,406	550	33	15
Apr.	5,812.2	259.1	261.0	4,575.8	716.1	5,281	516	31	11
May	6,104.9	282.0	259.4	4,777.0	786.5	5,522	533	31	11
June	5,911.3	254.2	276.5	4,631.9	748.7	5,348	486	30	11
July	5,994.8	280.4	250.0	4,702.8	761.6	5,317	378	23	10
Aug.	5,988.6	252.7	254.4	4,723.3	758.2	5,385	...	..	..
Sept.	5,811.6	257.7	243.7	4,576.8	733.4	....	...	..	..
9 mo.	52,429.2	2,392.7	2,280.8	41,271.6	6,583.5	....	...	..	..

* Source: U. S. Dept. of Interior, Bureau of Mines. ** Source: American Iron & Steel Institute. [1] Source: Bureau of the Census. [2] For sale only.

Peak Efficiency either *Gas or Oil* *with*

North American

Dual-Fuel Burners*



THE LINE IS *Complete*.....SELECT

THE BURNER YOUR OPERATING CONDITIONS REQUIRE

113—Long Flames. **220-221**—Short Flames, sealed-in mountings. **225**—For rugged duty, open or closed mounting, gas at zero. **232**—Compressed air atomizing oil inserts. **260**—Oiltogas Converter for burning oil as a gas in existing gas burners.

*Dual-Fuel: The North American name for burners designed especially for both gas and oil. Fuel changed by merely turning valves.

THE NORTH AMERICAN MANUFACTURING COMPANY

MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL

BRANCH OFFICES *with* FIELD ENGINEERS *in* PRINCIPAL CITIES

CLEVELAND 5, OHIO

Adventures of BILL

By PAT DWYER
Illustrations by RICHEY

RELAXED and comfortable the other night and apropos of nothing in particular, Bill declared that raising children was becoming more difficult with every succeeding year. "At one time," he said, "children recognized the fact that they knew nothing or next to nothing. At the same time they were firmly convinced that their parents knew everything. A decision by Paw on any subject—animal, vegetable or mineral—carried more weight than a unanimous verdict from the Supreme Court. What do we find today? A kid with a butch haircut and two front teeth missing can ask more high-ceiling questions in five minutes than two strong men could answer in a week."

"By a curious coincidence," I said, "I had an experience last week that seems to confirm your astute diagnosis. My seven-year-old twin grandsons, whose views never agree on anything, except when seized by the urge to pester some person, dropped a question in my lap. A question that would have stumped Moses, Solomon, Pontius Pilate and the Three Wise Men from the East. The twin heroes, now in the second grade and able to read announcements on the screen and the jargon in the so-called comic books, and with an encyclopedic knowledge and memory of every movie, television and radio program for the past two or three years, bounced into my presence and demanded that I tell them whether the 'Lone Ranger' or 'Cisco Kid' was the greatest picture of all time.

"Each little eager beaver, apparently filled with eau de vie, quicksilver and Mexican jumping beans, shouted the name of his favorite and demanded instant confirmation. The temptation to tell them the pitiful truth swayed me one way. The peculiar kind of wisdom grandfathers acquire by — at times — painful experience swayed me the other way. I knew that a verdict in favor of one little boy would prompt him to turn at least seven joyful handsprings. The same verdict would break the second little boy's heart and cause him to hide under the first convenient table or bed when he saw me coming."

"A tough spot," Bill admitted. "How did you weasel your way out of a very delicate situation?"

"Weasel is right. I told the boys I should like to study the subject for some time before deciding in favor of either picture. I should assign a certain number of points to each feature: Number of men and horses; number of shots and hands drank and fired; number of hits and misses; number of times (a) villian is knocked out cold and (b) hero ditto; number of days and nights spent without sleep, food or water; number of cigarets and weight of chewing tobacco consumed; and many other items of importance. In the meantime, if the litigants could spare the time and honor me with their company, I should be vastly pleased to escort them to a haven of delight within reasonable walking distance where a beaming philanthropist in a white apron would present them with ice cream cones and/or all-day suckers. That settled the picture question."

"Bare face bribery! And yet under the circumstances I am inclined to agree with your solution of a delicate problem. That 'best picture of all time' takes in a right smart bit of territory and would include 'Snow White and The Seven Dwarfs.' In my opinion, and the opinion apparently held by several million citizens, or whatever you call Betty Jane and Junior in mass formation, the picture was the most gorgeous and satisfying spectacle ever presented on the screen.

"It has everything—color, action, suspense. Triumph of virtue and innocence over vice and jealousy. A charming little maiden for a heroine; a flock of woodland creatures with more intelligence, sympathy and understanding than would be found in a similar flock of human beings; a beautiful little house in a bosky dell; and a band of seven dwarfs with hearts of gold, but with noses like young dirigibles or hunks of baloney. Sprightly songs and dances in perfect harmony with the general spirit—"

"No need of shouting. I saw the picture and if any person is sufficiently interested to ask for my vote, I unhesitatingly will cast it for Snow White and her cuties as the best picture of the year, or for that matter, any year. If and when it ever appears uptown or downtown, I shall see it again."

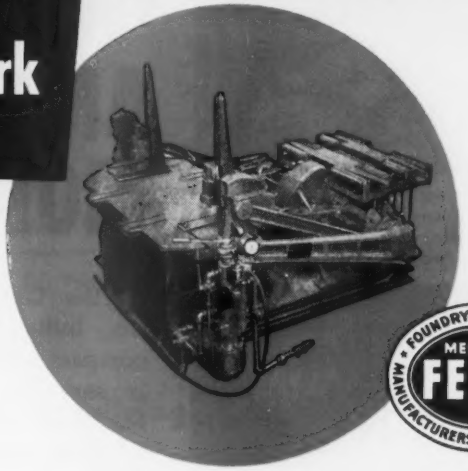
"That's the good old spirit. You could see it a dozen times and it would not do you any harm. The most gratifying feature, so far as I am concerned, is that the universal appeal of the picture bears out a contention I have been championing for

(*Continued on page* 202)

Evidence indicates lack of famous Buck-u-up binder in mixture

this foundry is a good place to work

Superior Steel & Malleable Castings Co.



THIS 35-year old company, located in Benton Harbor, Michigan, operates a steel and malleable foundry, a jobbing machine shop, a jobbing pattern shop, and a complete Engineering Department.

Obviously it is a good place in which to work. Approximately 650 people work here in an atmosphere of safety and good housekeeping and since the company started its operations in 1916 it has a record of no work stoppage of any kind due to a labor dispute.

Superior's steel foundry occupies about 70,000 sq.ft. of floor space and produces approximately 700 tons of miscellaneous jobbing castings per month in a range from ounces to 15 tons apiece. Its malleable foundry turns out approximately 400 tons per month. Complete laboratory control insures highest quality products.

Its safety record is excellent, its plant is clean, and its equipment modern. Herman molding machines are typical of this equipment. They help make Superior a good place to work because they're simple to operate, with one rotary valve handle; pressure lubricated; dependable; and work at peak efficiency under a wide variety of operating conditions.

At Benton Harbor, all over the U. S., and in foreign lands, Herman Molding Machines make their way by the way they're made.

Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Hand-pushed American MonoRail Cranes with air hoists serve the molding turntable where cores are set, molds closed and placed on an 82-car conveyor loop for transfer to pouring area.

Two MonoTractor driven ladle carriers move around the MonoRail loop from cupola to conveyor where carrier travel is synchronized for careful pouring.

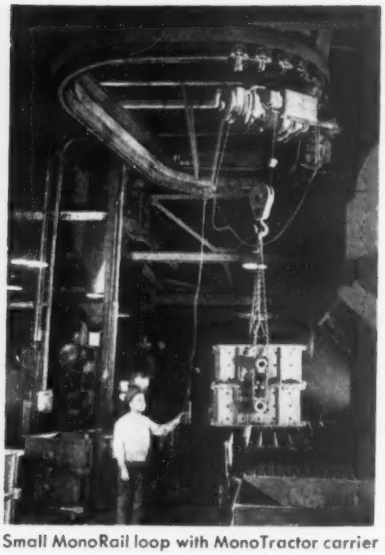
Modern Foundry Methods

WITH

AMERICAN MONORAIL

At the Chapman Valve Mfg. Co., Indian Orchard, Mass., a compact, 82-car conveyor loop is serviced by an American MonoRail system consisting of hand-pushed cranes and MonoTractor driven carriers. Both time and labor are saved through the mechanized transfer of both flasks and ladles.

Many other handling operations in the foundry can be efficiently and carefully performed with American MonoRail systems. Let an experienced engineer show you what has been done. Write for Bulletin C-1 offering hundreds of application pictures.



Small MonoRail loop with MonoTractor carrier removes flasks from conveyor to shake-out and return.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE ● CLEVELAND 7, OHIO

(*Continued from page* 200)

many years. Picture makers claim that the public wants nothing but stories showing wholesale and retail smashing of various of the Ten Commandments. Essential features include scenes of violence, robbery, murder and at least one view of a swanky night club where male and female crooks and criminals, ex actual and potential, in tail coats, tinted hair and decollete gowns live the life of Reilly between professional engagements.

"Possibly a neurotic, mentally deficient section of the population enjoys that kind of tripe. It does not appeal to the majority. With this stuff forced down its throat by the know-it-all producers, the patient public either has had to take it, or do without entertainment. Maybe the spontaneous and instant success of Snow White will convince the high command that John Q. Public is not a moron, a nitwit or a criminal at heart."

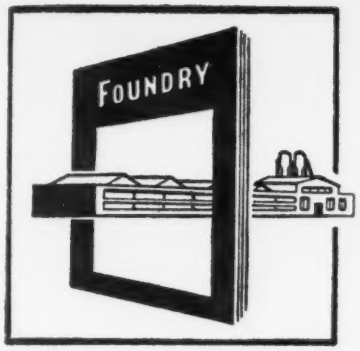
"While commending your courage and deploring your skill as a prophet —Snow White went through the mill about 13 years ago—for putting into words what many people are thinking, I see no occasion for frothing at the mouth. Get the old emotions under control. Take a leaf from the little short fellows' book and whistle while you work."

"Whistle while you work, eh? You did not notice old Grumpy doing any whistling, did you? Always bound to be at least one sourpuss in every group. Dopey, Sneezey, Sleepy, Doc, Happy, and Bashful, six happy little fellows, plied their hammers, picks and shovels in the mine and at the same time whistled a right tuneful melody in a manner that would have earned them a place on any professional program. Perhaps you remember they had the birds on the trees wagging their tails and wings at top speed to keep up with the singers. Grumpy did not cock a lip or join in the roundelay. Heart of gold and all that kind of stuff is shown later in the story, but in the early stages he wore a perpetual frown, spat and talked out of the side of his mouth and admonished the brethren to mark his word. Nothing good would come out of this, that or the other.

"Did I ever show you a photo of Dopey standing in the bed of a stream flowing through a rock garden outside the office of the Master Molder in one of our Navy Yards?"

"No." I said. "You did not show me any photo. Just to keep the record straight, where, when, how and what were you doing, in a Navy

(*Continued on page* 206)



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Our staff will forward this information to the advertiser immediately so you'll be relieved of the necessity of writing several letters. You'll hear from the advertiser directly, answering your request.

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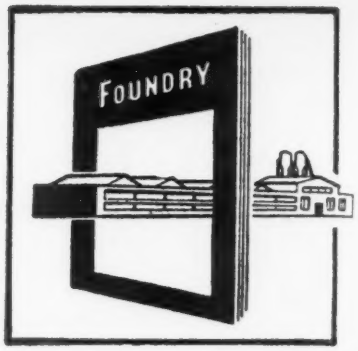

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Most copies of FOUNDRY are read by several individuals. We have provided three cards to accommodate all who wish to use this service.

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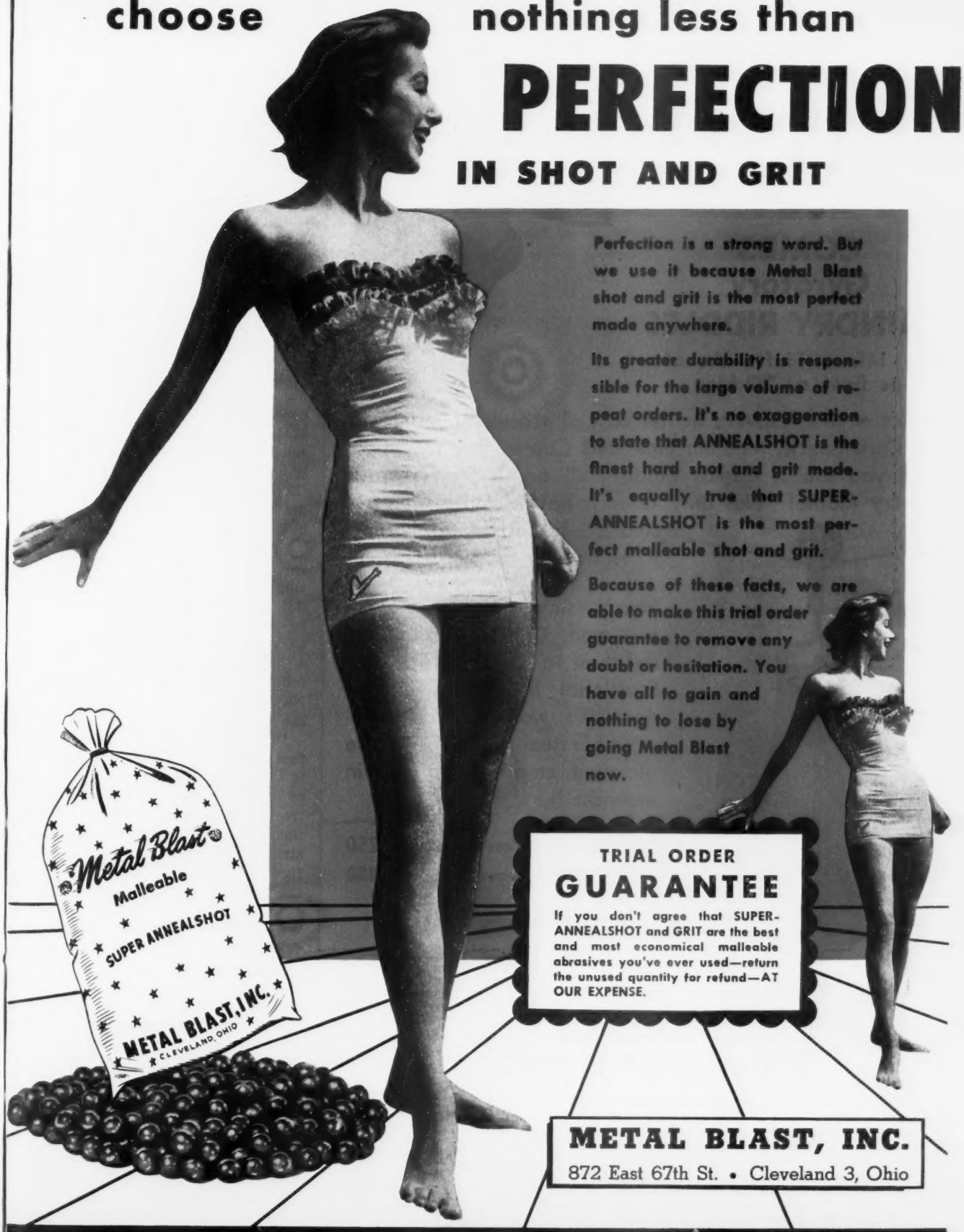
Readers Service

choose nothing less than

PERFECTION

IN SHOT AND GRIT



Perfection is a strong word. But we use it because Metal Blast shot and grit is the most perfect made anywhere.

Its greater durability is responsible for the large volume of repeat orders. It's no exaggeration to state that ANNEALSHOT is the finest hard shot and grit made. It's equally true that SUPER-ANNEALSHOT is the most perfect malleable shot and grit.

Because of these facts, we are able to make this trial order guarantee to remove any doubt or hesitation. You have all to gain and nothing to lose by going Metal Blast now.

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If you don't agree that SUPER-ANNEALSHOT and GRIT are the best and most economical malleable abrasives you've ever used—return the unused quantity for refund—AT OUR EXPENSE.

METAL BLAST, INC.
872 East 67th St. • Cleveland 3, Ohio

ANNEALSHOT The finest *hard* shot and grit made, but sells at chilled shot prices.

SUPER-ANNEALSHOT The perfect *malleable* shot and grit.

SCREENING COSTS CUT WAY DOWN!

with

COMBS Gyratory FOUNDRY RIDDLES

Sifts - Mixes - Fluffs - Aerates as Fast as 30 Men

There's a sweet saving in the cost of screening Moulding and Core Sands, Medium Fine and Coarse Dry Materials when you use a Combs Model "V" or "V-5" Gyratory Foundry Riddle! Not only does it better—more uniform, cleaner—but saves you up to 97% of your labor cost!

Type "V" Riddle

Sturdy, simple to operate by one man, Combs Riddles cost less than 1c an hour for power. Fractional horsepower motor does the work. Quickly removable steel-rim sieves can be removed, emptied, replaced in seconds.

Type "V" (20" sieve) Complete $250
Type "V-5" (36" sieve) Complete $450

Prompt Delivery from Your Foundry Supply House

Send for Free Descriptive Folder

(*Continued from page 202*)

Yard?"

"Carefully side-stepping the where, when and how, I was a member of a group which enjoyed the privilege and pleasure of touring the establishment on a beautiful summer day. On the way back to town one chatty lad regretted that he had not asked why the Navy still retains certain archaic terms in its otherwise perfect nomenclature. 'F'rinstance,' says he, 'here's a foundry, the ultimate last word in methods and equipment. The men in charge are known by the titles used when the plant was established well over a century ago. The superintendent is listed officially as the Master Molder. General foremen are Quarter Men. Assistants are Leading Hands.'

"A second party ventured the suggestion that when it comes to sticking rigidly to tradition, the Navy could give cards and spades to the Medes and Persians. A long, thin scholarly looking gent suggested mildly that if they riffled the pages of Gideon's Bible in the hotel bureau drawer, they would find the answer in Hebrews 13 and 8."

"Without naming any names," I said, "I wish a certain person would emulate the long, thin, scholarly looking gent. Then I would not have to chase over the well known 40 acres to pin him down for an answer to a definite question, viz., to wit, as follows: What was Dopey doing in a Navy Yard? And please don't tell me he was in uniform."

"This little metal Dopey, about a foot high, is a foundry product and is the result of a rather peculiar set of circumstances. The master molder freely discussed all details in connection with the job. Since it was a strictly government project no cost figures, of course, were included in the report.

"Some time after he saw the Snow White picture the commandant of the yard decided to model the seven little sawedoffs and set them up as ornaments on the lawn in front of his residence. Officially maintaining a stern and aloof demeanor as the supreme authority, he followed the dictates of a traditional sailor's tender heart in his brief periods of relaxation. In this particular instance he secured a batch of clay and sculped the seven figures. However, he discovered what nearly all amateurs discover when they blithely attempt to do something which is possible only after skill and knowledge have been developed and acquired over a long training period. The clay figures were greatly admired by the sculptor and his friends. Alas, in the oven or kiln they cracked and sagged and warped to a deplorable extent. No

good.

"Obviously for a man to arrive at the top of the tree in the Navy or in any other field, he has to have what it takes in the way of ability, energy and resourcefulness. If he is blocked in one path he takes another. In this instance the commandant washed the clay and responsibilities off his hands and graciously granted permission to the master molder to carry out the mission. In keeping with Navy regulations when ordering supplies of any kind, he told the M. M. to knock out about half a dozen copies of each dwarf, or a total of 42 castings. Probably wanted them for spares or replacements. Fortunately, the wind occasionally is tempered to the shorn lamb. Shortly after placing the order, or the requisition, the C was transferred to another naval station. With the exception of Dopey, the order never was completed.

"Following the example so kindly supplied, the M. M. turned the job over to a clever young lad in the laboratory. He prepared a lump of fairly stiff wax and carved a flat figure with legs and arms stretched out. This was easily molded without undercuts, drawbacks or cores in an ordinary snap flask. According to the M. M., the pattern closely resembled one of the gingerbread cookies with raisins for buttons, made by his mother when he was a boy. In fact, a baked gingerbread or dough material might have been used for a pattern.

"After the lead casting was removed from the mold, the young patternmaker and molder, armed with a sharp knife and a few small chisels and gouges, carved the undercuts, accentuated the details, and bent the arms, legs and body to the desired shape. Then the flume and rock garden were built outside the office window to give Dopey a permanent and happy home.

Book Review

Profit Sharing Manual, revised 1951 edition, 330 pages, 8½ x 11 in., published by the Council of Profit Sharing Industries, Akron, O. Price $10.50.

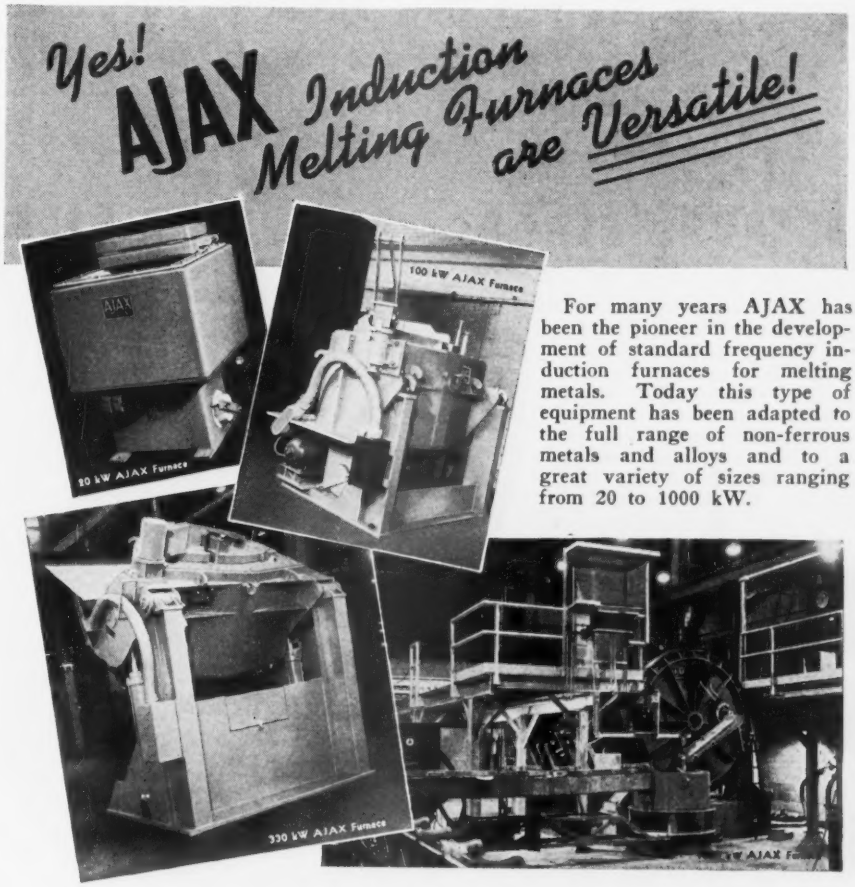
Advantages of industrial partnership are outlined in this book, which gives case histories of companies that have adopted profit-sharing plan of management. Included in the contents are discussion on installation of the plan, different types of profit sharing, advantages of profit sharing trusts, incentives, legal aspects, wage and hour consequences, salary stabilization, and securities and exchange problems. Information is given on the Council's history and the advances it has made since its organization in 1947.

Quality of Cast Steel

(*Concluded from page* 117)

ture of molten steel interferes with the effectiveness of the process. Certainly a simple, economical means of sulphur removal would be of great benefit to the steel casting industry. Currently, several new processes for sulphur removal are in the development stages and while some show considerable promise, none is yet applicable to commercial production.

The problems encountered in producing castings to exacting mechanical property specifications are by no means insurmountable, as castings are currently being made by several producers to specifications that formerly would have been considered unduly restrictive. These specifications are being met by applying close quality control which includes low limits



For many years AJAX has been the pioneer in the development of standard frequency induction furnaces for melting metals. Today this type of equipment has been adapted to the full range of non-ferrous metals and alloys and to a great variety of sizes ranging from 20 to 1000 kW.

AJAX Induction Melting Furnaces are now used for the following applications: Die Castings, Permanent Mold Castings, Sand Castings, Billets for Rolling and Extrusion, Recovery of Scrap, Galvanizing and Aluminizing of Steel and many others.

For special applications an Automatic Electromagnetic Pump allows continuous feeding of molten metal into the molds as they move past. Hand ladling is eliminated. Temperature, of course, is also automatically controlled and there is no chance of overheating the bath at any time during the melting cycle.

AJAX ENGINEERING CORP., TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

FAST DELIVERY on

PELRON

BETTER CORE OILS

Good news to the production foundry is the fact that PELRON Advanced Type Core Oils are available in any quantity for Quick Delivery!

PELRON ADVANCED TYPE CORE OILS

will perform in your core room just as they are performing in every type shop, giving you these advantages:

- Higher green strength
- Higher baked strength
- Lower baking temperature
- Shorter baking time
- Increased production, reduced cost
- Smoother cores, for better castings
- Excellent performance in either blown or hand-rammed boxes
- Complete collapsibility for cleaner shake out

There's a PELRON CORE OIL, PROVED BY PERFORMANCE, FOR EVERY METAL.

Call our nearest sales office for full information and technical assistance.

PELRON CORPORATION

7740 W. 47TH STREET, LYONS, ILLINOIS

Sales Offices: Chicago Detroit Cleveland South Bend Indianapolis Milwaukee Rock Island Buffalo

on sulphur, furnace practice that insures low quantities of dissolved gases in the metal, deoxidation practice that insures soundness without appreciably affecting ductility, balancing of carbon and alloy content, and precise control of heat treatment.

Editor's note: This paper was presented before the fourth annual AFS Ohio Regional Foundry Conference in Cleveland.

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8. "Causes and Prevention of Intergranular Fractures in Cast Steel" by C. H. Lorig, AIME Electric Furnace Conference, 1945.

OBITUARY

HARRY M. PFLAGER, 84, director, General Steel Castings Corp., Granite City, Ill., and Eddystone, Pa., died Oct. 28. Mr. Pflager attended Washington University and joined American Steel Foundries, Granite City, in his early career. He later was co-founder with Clarence H. Howard, of Commonwealth Steel Co., continuing as senior vice president of General Steel Castings Corp., when it acquired the former company. He retired in 1946. Mr. Pflager played an important part in development of large and intricate one-piece castings for railroad equipment.

* * *

Henry H. Erkelenz, 72, former vice president, Harnischfeger Corp., Milwaukee, died Oct. 6. Mr. Erkelenz, a native of Germany, joined the engineering department of Harnischfeger Corp. in 1911, became works manager in 1925, executive engineer in 1937, and vice president in charge of engineering in 1943. He retired two years ago.

* * *

John F. Benjamin, 49, vice president in charge of sales, Warren Foundry & Pipe Corp., Phillipsburg, N. J., and Warren Pipe Co. of Massachusetts Inc., Everett, Mass., its subsidiary, died Oct. 22, in Washington, Ga.

* * *

W. Bruce Ogden, 58, vice president, Valley Mould & Iron Co., Hubbard, O., died Oct. 17, in Chicago, while on a business trip. A graduate of Denison University, Mr. Ogden was

associated with Brier Hill Steel Co., Youngstown, O., until it was acquired by Youngstown Sheet & Tube Co., when he joined Republic Steel Corp. A short time later he joined Valley Mould & Iron Co., becoming sales manager in 1939 and shortly after, vice president.

* * *

Robert N. Blakeslee, 58, vice president and director of engineering, Ajax Electrothermic Corp., Trenton, N. J., died Oct. 17. He was associated with Ajax for 24 years.

* * *

Minor L. Carpenter, 63, foundry engineer, International Harvester Co., Indianapolis, died Oct. 5. Mr. Carpenter had been associated with the company for 6 years.

* * *

William T. Barker, 81, owner of the former William T. Barker foundry, Bridgeton, N. J., died at his home there Oct. 18. Mr. Barker retired in 1929.

* * *

William I. Abrams, 52, president, Atlas Foundry Co., Irvington, N. J., died Oct. 28. Mr. Abrams became president of the foundry 5 years ago.

* * *

Walter H. Badger, 57, foreman, C. A. Goldsmith Co., Newark, N. J., died Oct. 20. Mr. Badger had been with the company for 37 years.

* * *

Charles A. Roberts, 61, president-general manager, Western Foundry Ltd., Wingham, Ont., died Oct. 18, in Toronto.

* * *

John E. Jordan, 78, founder and owner of the former Pero Foundry Co., Worcester, Mass., died Oct. 22.

NPA Forms Nonferrous Scrap Committee

National Production Authority has formed a 30-man nonferrous industry scrap mobilization committee to speed the flow of copper, brass, bronze, aluminum, and lead scrap to the nation's industrial economy. Officers are: Chairman, T. E. Veltfort, manager, Copper and Brass Research Association, New York; vice chairman, M. L. Tressell, Aluminum Co. of America, Pittsburgh, and secretary-treasurer, Paul Herzog, Federated Metals Division, American Smelting & Refining Co., New York.

Committee activities will parallel those of the steel scrap mobilization committee, and operational funds will be supplied by the nonferrous metals industry.

Designed to handle loads of 500, 1000, or 2000 lbs., the Shepard Niles Lift-About Jr. electric hoist actually exceeds, in performance, that which customarily is expected from these lighter service hoists. And requires less maintenance in doing so.

Two factors are responsible for such outstanding performance: one is a sound engineering background that comes from years of specialized experience. This is apparent in the design and construction of the hoist itself. The other is the Shepard Niles policy of making certain that the hoist you buy is the *right* hoist for *your* service. It is a policy that protects against buying a hoist that is too light for severe service. By the same token, it prevents investing more than necessary when lighter service *is* indicated.

If you would like help with your handling problems, write us. A Shepard Niles specialist will be glad to place our years' of material handling experience at your service.

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads

360 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

PURDUE METALS CASTING CONFERENCE

Sets New Record in Attendance

By ERLE F. ROSS
Chicago Editor
and WILLIAM G. GUDE
Managing Editor
FOUNDRY

THE fourth annual Metals Castings Conference held at Purdue University, West Lafayette, Ind., Nov. 1-2, eclipsed previous events by every standard. Registered attendance of approximately 240 was a new high by a wide margin and the program was both excellent and timely.

Some of the meeting's success undoubtedly stemmed from the defense program, which is bringing foundrymen together more closely in their effort to work out problems arising from dislocation of materials and requirements for castings. Another influence is the expanded interest of the university in the foundry industry, springing from its modernized foundry laboratory and its participation in the Foundry Educational Foundation program.

The conference, held in the Memorial Union Building, was sponsored jointly by Purdue's department of general engineering and the school of chemical and metallurgical engineering, and the Michiana and Central Indiana Chapters of the American Foundrymen's Society.

Robert Spurgin III, Swayne-Robinson & Co., Richmond, Ind., was chairman of the conference committee. Program chairman was L. D. Reiff, Superior Steel & Malleable Casting Co., Benton Harbor, Mich. C. T. Marek and R. W. Lindley, of the university's department of general engineering, served as vice chairman and secretary, respectively.

H. A. Bolz, head, department of general engineering, Purdue, and V. S. Spears, sales engineer, American Wheelabrator & Equipment Corp., Mishawaka, Ind., were co-chairman for the opening session. Prof. Bolz in introductory remarks explained that purpose of the conference was twofold—to bring together for exchange of ideas men interested in latest developments and current practices in the metals casting field, and good fellowship.

In the absence of A. A. Potter, dean, schools of engineering, Purdue, Dr. G. A. Hawkins, associate director, engineering experiment station, spoke briefly on the university's interest in industry. The school recognizes its responsibilities toward industry in the state and welcomes the opportunity to engage in co-operative ventures with it. The same applies to units of industry outside the state. The university's participation in the Foundry Educational Foundation program, he said, was an example of such an objective.

Following Dr. Hawkins on the program, I. R. Wagner, national vice president, American Foundrymen's Society, and retired president, Electric Steel Castings Co., Indianapolis, spoke on "Interest of the Foundry Industry in Education." Engineers and key men of foundry production can be obtained in two ways, he said. One procedure is to employ novices and give them in-plant training; the other is to take men with formal education, such as is provided by universities and technical schools. The question then arises as to why foundries generally choose university graduates rather than take high school graduates and give them four years of shop training.

The answer to this, according to Mr. Wagner, is that industry is lazy and prefers to depend upon teachers to do the training. In how many instances, he asked, have two or more foundries joined hands in worker training?

Continuing, the speaker commented that productivity of workers has been decreasing for two decades and for the remedy for this industry has a right to look to educational institutions.

In many schools, Mr. Wagner observed, foundry practice is taught as an industrial art, but experience shows that this approach does not create interest in students. In conclusion, he made emphatic that there is much opportunity in the foundry for young men.

In discussing the evaluation and training of personnel for industry, Ernest H. Reed, manager, education and training, International Harvester Co., Chicago, emphasized that the training program adopted by one company is not necessarily suited to another. Unfortunately, he pointed out, we have paid more attention to technology than to human beings, although the latter comprise the most complicated machine in a plant.

Factors basic to the setting up of any training program for supervisors, the speaker said, are these:

1. Remember that a man who succeeds in one plant or one job may fail in another, and vice versa.

(*Continued on page* 213)

Purdue conference committee members. Left to right, front row: R. W. Lindley and C. T. Marek, Purdue; Robert Spurgin III, Swayne-Robinson & Co.; E. G. Richardson, Delco-Remy; V. S. Spears, American Wheelabrator & Equipment Corp.; Carl Schopp, Link-Belt Co. Back row: H. A. Bolz, Purdue; Stanley Krzeszewski, American Wheelabrator & Equipment Corp.; James Barrett, National Malleable & Steel Castings Co.; G. M. Enos, Purdue; L. D. Reiff, Superior Steel & Malleable Casting Co.; W. O. Ferrell, Auto Specialties Mfg. Co.

Mr. Production is high man...

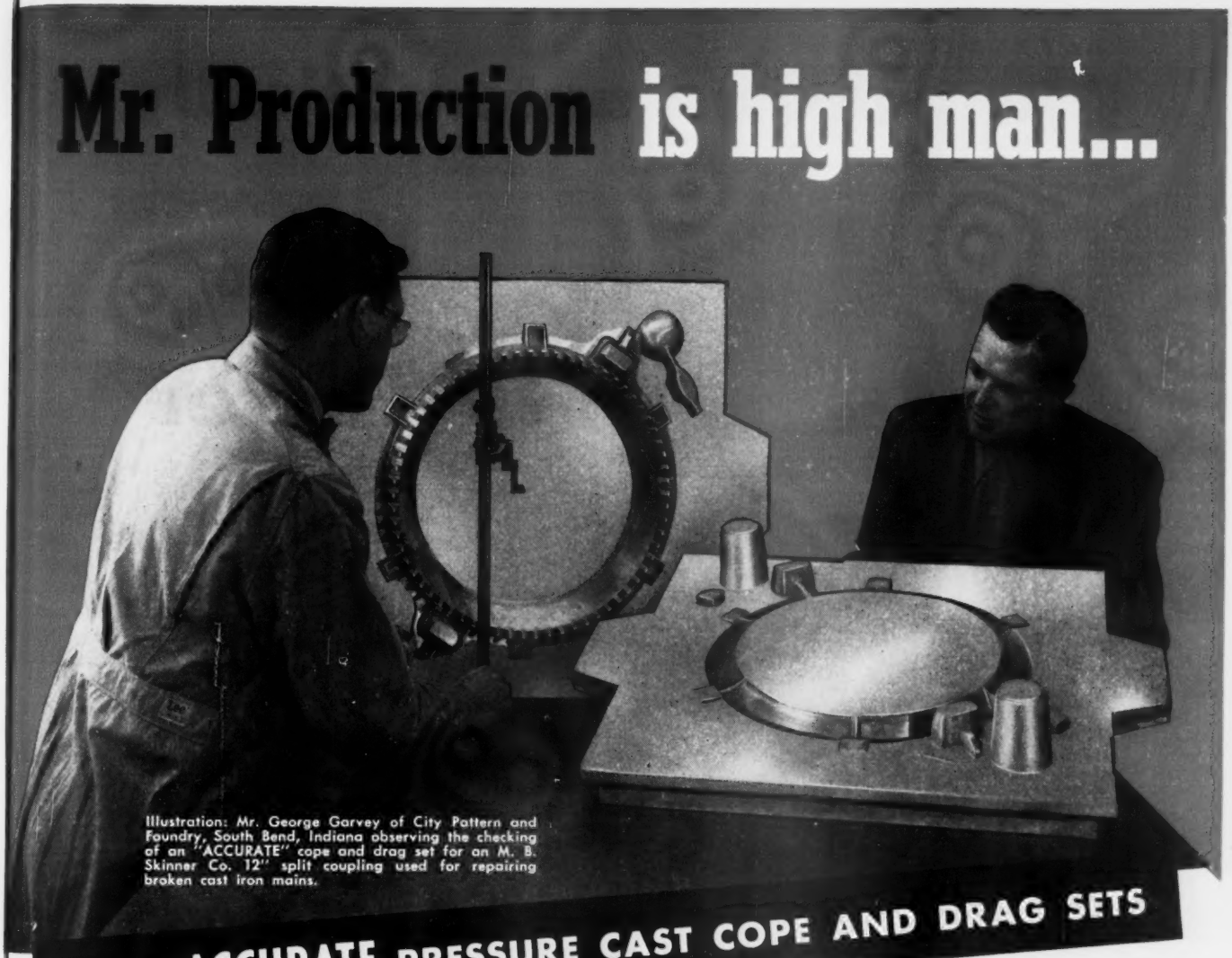

Illustration: Mr. George Garvey of City Pattern and Foundry, South Bend, Indiana observing the checking of an "ACCURATE" cope and drag set for an M. B. Skinner Co. 12" split coupling used for repairing broken cast iron mains.

WITH ACCURATE PRESSURE CAST COPE AND DRAG SETS

QUICK DELIVERY

By Air Freight, Parcel Post, Special Delivery or Railway Express. Pick-up and delivery by jobber representatives in the following areas:

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Telephone: Normal 8551-5

LOS ANGELES, CALIF.
McGowan Company, Inc.
Telephone: Trinity 2057

OAKLAND, CALIF.
General Foundry Service Corp.
Telephone: KEllog 3-3381

Foundries everywhere are looking for means to increase production and lower their costs. ACCURATE cope and drag sets have helped to solve this problem for hundreds of the leading foundries from coast to coast.

ACCURATE cope and drag sets have clean smooth partings and patterns as cast, are straightened, and have alignment points. This will substantially reduce your finishing costs.

Maximum over-all plate dimensions for cope and drag sets are 54" x 64" and 48" x 80".

Why not use this profit making idea in your foundry? Write for catalog No. 515.

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Cores drawn automatically*

300% faster

*even with unskilled labor

SUTTER

POWER-ROLLOVER AUTOMATIC CORE DRAW MACHINES . . .

The Sutter Core Draw Machine is completely automatic. The operator needs only to push the start button and remove the drawn cores from the table. Since this automatic cycle takes only six seconds—from clamping of the dryer until the drawn core rests on the table—production is increased 300% to 400%. At the same time, because every core is drawn automatically and *uniformly*, even unskilled operators can maintain peak output of the most complicated cores.

The Sutter Core Draw Machine is equipped with a double rollover frame so that the operator can blow one core while another is being drawn. Power-rollover and draw have speed control for regulation to any production cycle. Thus, these versatile machines may be used with an automatic core blower—on either or both sides—where the operator blows and draws cores or in a loop set-up where cores are hand drawn.

Four standard sizes meet the requirements of most foundry applications but specials can be developed for the unusual job. Complete information is contained in Sutter Bulletin "F". Send for it today.

IN USE IN LEADING U.S. FOUNDRIES . . .

Sutter Automatic Core Draw Machines are in use in a number of leading U.S. foundries. If you are interested in seeing one in operation, we will gladly arrange for you to visit the nearest one in your locality.

SUTTER PRODUCTS COMPANY

2005 WESTWOOD AVENUE • DEARBORN, MICH.

(*Continued from page* 210)

2. Consider the process used to fill the qualifications wanted of an individual for a job.

3. What type of development do these men need? Check with the men in determining what type of training they require.

4. Is it a training problem? A training program won't overcome some problems that develop in supervision.

5. What is the objective the training program is intended to reach?

6. What are the things a supervisor needs to know?

Mr. Reed stressed the fact that an individual learns less by telling him how to do something than by showing him how to do it.

One session with two speakers was devoted to nondestructive testing of castings. Royal G. Tobey, Eastman Kodak Co., Rochester, N. Y., spoke first on use of x-ray examination of castings, with William Ferrell, vice president, Auto Specialties Co., St. Joseph, Mich., as chairman.

Mr. Tobey gave a comprehensive discussion of the radiographic techniques employed with x-ray of varying intensities to inspect castings for discontinuities and to effect the most efficient gating and risering practice in castings before starting full-scale production. As another possible use of x-ray, Mr. Tobey suggested its employment to investigate formation of defects by viewing castings in the molten state as the defects are developing.

R. M. Whaley, department of physics, Purdue, presided at the second part of the session, comprising an explanation of use of cobalt-60 for gamma-ray inspection of castings. Speaker was John C. Pennock, Tracerlab Inc., Boston. This material, produced by the Atomic Energy Commission by placing cobalt into a nuclear reactor, is more nearly comparable to radium than x-ray in the time required to reproduce photographically the internal structure of a casting. It is most comparable when inspecting section thicknesses of ¾ to 6 inches, Mr. Pennock said.

Paul H. Harlan (right), Electric Steel Castings Co., Indianapolis, is presented a pair of book-ends by Prof. H. A. Bolz, Purdue. The award recognized Mr. Harlan's activities in promoting the annual Purdue conference and work of the Foundry Educational Foundation

Use of cobalt-60 was demonstrated by actual exposure of a specimen to several defective castings, followed by development and display of the film mounted behind each piece. Mr. Pennock said that the cost of the necessary amount of cobalt-60 and appurtenances for the average foundry—but not including cost of the photographic equipment, which would be about $150—would be approximately $800.

An open-house of Purdue's modernized foundry laboratory concluded Thursday's technical program. The new facilities, provided at a cost of more than $100,000, incorporate equipment designed to acquaint students with equipment available in the modern foundry for sand preparation and testing, materials handling, metal melting and casting cleaning. Layout of the foundry was described in September FOUNDRY, p. 148.

Two motion pictures on foundry subjects were presented at the concluding day's sessions. Warner B. Bishop, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, prefaced a showing of that company's film, "The A.D.M of Cores," with recommendations concerning the proper combinations of binders and their order of addition to sand to obtain desired properties in cores.

Harold Weimer, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, presented "Mechanization in Molding," a film produced by that company under auspices of the AFS Plant and Plant Equipment Committee to describe molding equipment employed in plants ranging from small jobbing shops to high production foundries. Chairmen at these sessions were Carl Schopp, Link-Belt Co., Indianapolis, and James Barrett, National Malleable & Steel Castings Co., Indianapolis.

Sources of trouble in cupola operation were cited by Walter Jaeschke, Whiting Corp., Harvey, Ill., in a comprehensive discussion of factors involved in and types of equipment available for this type of melting.

A capacity attendance hears Walter Jaeschke, Whiting Corp., address the Purdue conference

FAMOUS "Milwaukee thread stem" design has been skillfully engineered to permit the use of a heavier stem to insure proper core support without sacrificing fusibility. If you are working with pressure type precision castings, Milwaukee Chaplets are a "must" for improved production, fewer rejects, and all around excellence in quality.

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E. G. Richardson, Delco-Remy Division, Anderson, Ind., and Prof. G. M. Enos, Purdue, were co-chairmen at the session.

Mr. Jaeschke emphasized that scrap should be watched closely because of its nonuniform composition. Avoid nonferrous contaminants; one foundry accomplishes this by paying its charging crew a bonus for nonferrous scrap found in the charge. Never charge closed vessels; they can explode. Avoid small scrap pieces in early charges to minimize oxidation. Hang-ups will cause variations in iron analysis; to prevent them charge scrap pieces no longer than one-third the cupola diameter. Avoid rehandling coke and eliminate fines where possible. Holding furnaces offer an effective means of leveling out carbon variations during the heat.

Under the chairmanship of Prof. I. W. Burr, Purdue, and C. E. Westin, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., an exceptionally able discussion of practical quality control was given by R. W. Gardner, supervisor of quality control and inspection, Ford Motor Co.'s iron foundry, Dearborn, Mich.

Mr. Gardner showed examples of charts which indicate readily whether or not quality of a particular casting is under control. Such castings as a rocket part, crankcase, manifold and camshaft were used as examples, and the control factor measured in each case—such as critical dimensions, shrinkage, dirt—was selected as the one most likely to affect final casting quality. On high production items dimensional checks are made at the shakeout; if the part is out of control, immediate remedial steps will minimize scrap castings.

Main social event of the conference was a banquet Thursday evening. Some 20 students participating in the Foundry Educational Foundation program at the university were guests. The FEF program is now in its third year at the university and currently has 25 participating students. One of these is a graduate student. Toastmaster was Stanley Krzeszewski, vice president of manufacturing, American Wheelabrator & Equipment Corp., Mishawaka, Ind.

Mr. Krzeszewski introduced Prof. Bolz who performed an unscheduled ceremony honoring Paul H. Harlan, Electric Steel Castings Co., Indianapolis. As an appreciation of his services as chairman of the Purdue Advisory Committee for the Foundry Educational Foundation, and for his work on the annual conference, Mr. Harlan was presented a pair of bookends cast in the Purdue foundry and bearing the university seal.

Principal speaker at the banquet was Edward A. McFaul, world traveler and speaker, Northwestern University, Evanston, Ill. His address—"How Confused Can We Get?"—contained a serious message but it was skillfully concealed in a wealth of humor.

German Foundry Conference Has Large Attendance

Approximately 1500 attended the annual meeting of the Verein Deutscher Giessereifachleute held in Duesseldorf, Germany, Sept. 27-29 at Robert Schumann hall. Some 85 representatives from Belgium, Chile, Denmark, England, France, Italy, Holland, Norway, Austria, Sweden, Switzerland and United States also were present.

J. H. Kuester, president of the society gave the address of welcome, and L. Brandt, member of the German Ministry spoke on "Tasks of the Engineer in Future Germany."

During the several technical sessions held a number of papers and discussions were presented as well as two motion picture films from the United States. One of those related to treatment and preparation of sand in mulling equipment, and the other pertained to "Principles of Gating and Casting Technique." H. Herschnz, Frankfort-am-Main-Hoechst, spoke on using synthetic sands and the advantages of such use.

M. Beilhack, Rosenheim, and H. Gries, Braunschweig, discussed cement-sand molding. Ernst Mickel, Stuttgart-Bad Cannstatt, pointed out that to make full use of the fatigue limit of malleable iron it is necessary to develop molding methods which will provide a smooth surface on the castings. O. Werner, Berlin, spoke on the advantages of spectrographic analytical procedure in foundry practice.

K. Fink, Duesseldorf, described the application of the S-R wire gage in determining stresses in gray iron castings. W. Magers, Duesseldorf, talked on modern core drying methods with particular reference to the dielectric process. The lost-wax or investment molding method and its advantages was described by H. Heimann, Kaiserlautern, while E. Lanzendoerfer, Muelheim - am - Ruhr, gave information on application and advantages obtained from use of exothermic materials in gates and risers. Closing paper on the program was that of Prof. E. Piwowarsky, Aachen, on "Pre-Christian Molding and Pouring Practice".

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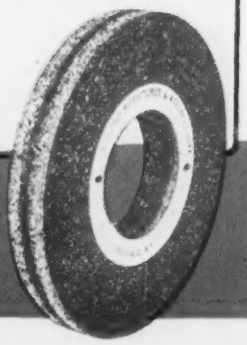

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Industry BRIEFS

CRUCIBLE Steel Casting Corp., 2850 South Twentieth St., Milwaukee 7, has merged with Ebaloy Inc., 700 South St., Rockford, Ill., and will be known as the Crucible Steel Casting Co. Division. R. D. Colburn is president of both firms, and headquarters will be in Milwaukee. Crucible recently completed a $250,000 expansion program and plans enlargement of aluminum casting operations at Rockford to handle Air Force subcontract work.

* * *

Meehanite Metal Corp., New Rochelle, N. Y., has licensed the following companies to produce Meehanite castings: Massey-Harris Co., Toronto, Canada; Compton Foundry, Compton, Calif.; Bates & Company Stoves Pty. Ltd., Melbourne, Victoria; W. H. Dorman & Co., London, and A/B Kockums Mekaniska Verkstads, Malmo, Sweden.

* * *

Prairie View A and M College, Prairie View, Tex., has completed installation of a modern foundry for student training. Ferrous and nonferrous foundry equipment includes a cupola with turbo compressor and air weight controller, a tilting crucible furnace with positive displacement blower, and a full line of sand handling equipment. Pattern and coremaking departments and a complete laboratory for research, testing and experimental work complete the foundry layout.

* * *

Consolidated Industries Defense Production Pool Inc., has been incorporated in New York to operate as a foundry and machine shop. Directors are Sinclair Robinson, 715 Park Ave.; John H. Connelley, 400 East 58th St., and Sidney W. Fox, 745 Fifth Ave., all of New York.

* * *

Ross-Meehan Foundries Inc., 1601 Carter St., Chattanooga 1, Tenn., is installing new heat-treating equipment for use in production of cast armor. Company also will establish a special department at the University of Chattanooga's industrial research institute for testing cast steel.

* * *

Su-Val Machining & Casting Corp. has been incorporated in New York to produce castings and machinery and deal in foundry products. Directors are Benjamin A. Demos, Leon A. Cohen, and Sylvia Gould, 16 Court St., Brooklyn, N. Y.

* * *

Carborundum Co., Niagara Falls, N. Y., is exclusive sales agent for a cushion type split drum sander which uses coated abrasives in strip form and is manufactured by American Diamond Saw Sales, Portland, Oreg.

* * *

Yale & Towne Mfg. Co.'s Philadelphia Division, has appointed Baker Equipment Engineering Co., 404 Morris St., Charleston, W. Va., representative for Yale materials handling equipment.

* * *

Link-Belt Co., Chicago, has opened a factory branch store at 108 South Fourth West St., Salt Lake City 1, Utah. Donald W. Newsome is district manager.

* * *

Globe Iron Co., Jackson, O., has resumed production of silvery pig iron after a 41-day shutdown of its blast furnace. The stack was relined and enlarged, and a new secondary

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INDIANA PRODUCTS COMPANY
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United Artists Bldg.
Detroit 26, Michigan

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another CANNON core sand *product*

THE NUGENT SAND COMPANY, INC. *Since 1912* MUSKEGON, MICHIGAN

dust catcher added. All auxiliary equipment for the furnace was rebuilt. Marshall H. Jones, president and general manager of the company, was in charge of the project.

* * *

Meloon Bronze Foundry Inc., 206 Sunset Ave., Syracuse 8, N. Y., has purchased Ray Caldwell Co., 1841 LeMoyne Ave., Syracuse 4. Both plants will continue operation while additions are built at the former Caldwell property. Meloon then will move to the LeMoyne Ave. address.

* * *

Bosworth Foundry Inc., 1759 N. Bosworth Ave., Chicago, ceased business recently and its equipment was disposed of by auction Nov. 6. For many years the company produced brass and bronze castings. Melting equipment consisted of six 600-pound crucible furnaces.

* * *

Hauser Machine Tool Corp., foundry and factory supplies and machine shop, has been incorporated in New York by H. Miller, 427 52nd St., Brooklyn, N. Y.; H. E. Fitzgerald, 11 Schermerhorn St., Brooklyn, and M. D. Tuohy, 8969 218th Plaza, Queens Village, N. Y.

* * *

Foundry Services Ltd. held a 3-day conference in October at Welcombe Hotel, Stratford-upon-Avon, England. Representatives from European countries, Australia, India, and Canada were present to discuss home and overseas matters.

* * *

Dayton Steel Foundry Co., 1366 Miami Chapel Rd., Dayton 1, O., has started production in a recently acquired plant at Portsmouth, O. Company produces brake drums for trucks and trailers.

* * *

John Mohr & Sons, Chicago, has incorporated a subsidiary company, Mohr Open Hearth Division Inc., to engage in all phases of open hearth furnace engineering and construction.

* * *

Vanadium Corp. of America has leased from Hetzer Mines Inc. the latter's tungsten mill located at Nederland, Colo. Mill capacity will be enlarged.

* * *

Cleco Division, Reed Roller Bit Co., Houston, Tex., has appointed Harris Pump & Supply Co., Brady & Sidney Sts., S. S., Pittsburgh 3, distributor for its air tools and accessories.

* * *

Motor Castings Co., 1323 South 65th St., West Allis, Wis., suffered fire damage estimated at $8000 Oct. 27.

Over 40 years' experience in 'Well-made' Wood and Metal Patterns

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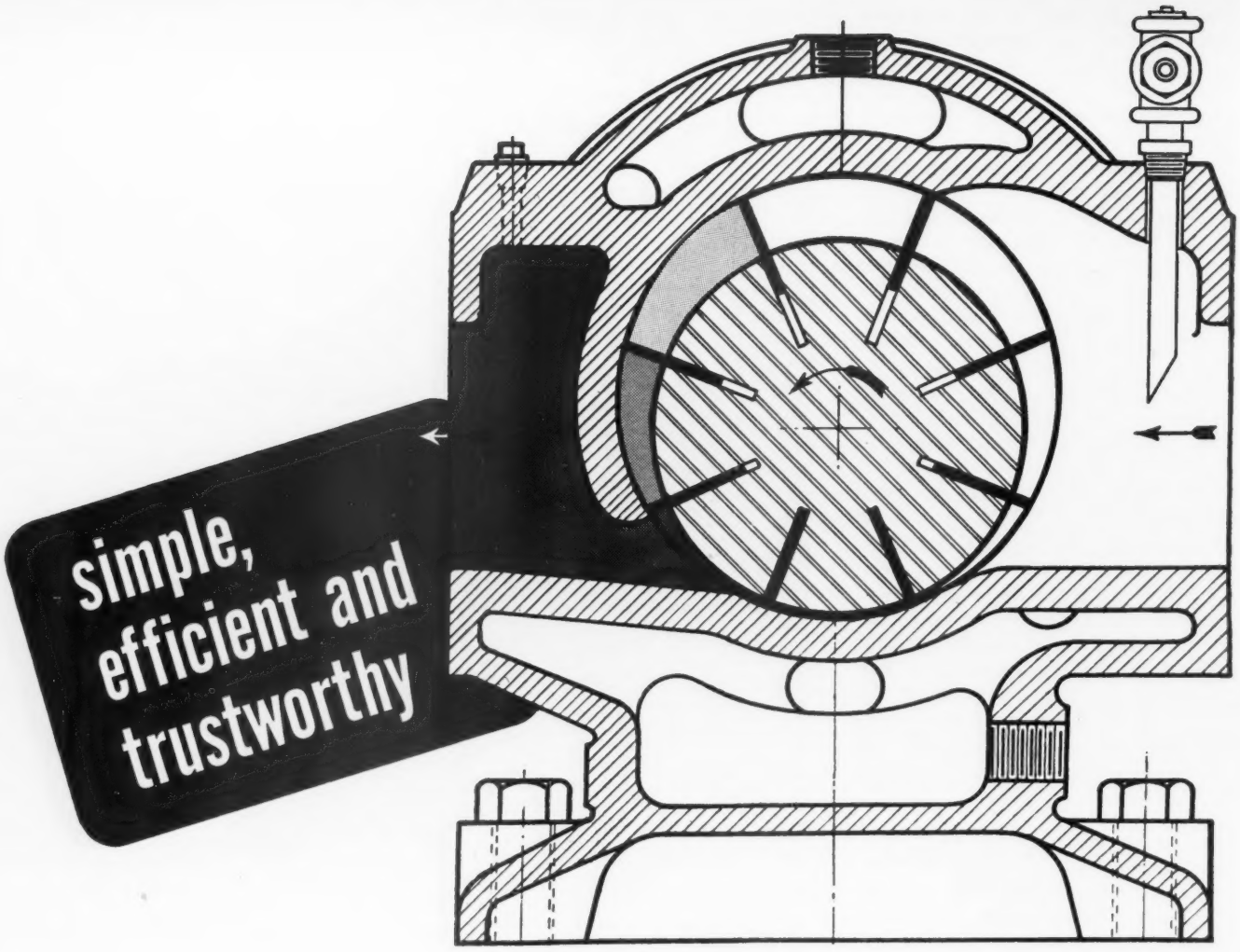

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For compressing gas, no reciprocating compressor can compare in simplicity and operation with a rotary.

PRINCIPLE IS SIMPLE

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OPERATION IS EFFICIENT

The Fuller Rotary Compressor assures a smooth flow, with no pulsations ... numerous displacement deliveries per revolution as against one in a single-cylinder piston compressor. Other advantages are: Direct drive; Compact installation; Simple foundations; Maintained capacity and efficiency; and No valves to leak. Because there are few moving parts—rotor, blades, and bearings, **maintenance time and costs are negligible.**

For further information on Fuller Rotary Compressors that will do a better job for you, write for Bulletin C-5.

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C-218

NEW ENGLAND FOUNDRYMEN MEET

In 11th Regional Conference at MIT

By PAT DWYER
Engineering Editor
FOUNDRY

SPONSORED by a dozen technical societies in addition to the original or prime mover, the New England Foundrymen's Association, the 11th New England Regional Foundry Conference, staged at the Massachusetts Institute of Technology, Cambridge, Mass., Oct. 19-20, ably sustained the reputation built up over preceding years.

Thomas I. Curtin Jr., Waltham Foundry Co. Waltham, Mass., was chairman of the committee on conference arrangement. He was assisted by Robert C. Walker, Whitin Machine Works, Whitinsville, Mass., vice chairman, and Fred Holway, Mystic Iron Works, Boston, program chairman. Reception and registration committee was made up of members of the foundry supply companies with C. A. Wyatt, Deveboise-Anderson Co. Inc., as chairman and Herbert H. Klein, Klein-Farris Co., as co-chairman. Representatives of the foundry supply companies also sponsored the final feature of the conference, the 11th Foundrymen's Smoker Saturday night Oct. 20 on the Parker House roof, Boston. Committee was headed by Harry Impey and Ray Hunter.

At the opening meeting Friday morning, Prof. Carl Floe, substituting for Thomas K. Sherwood, dean of engineering, MIT, delivered the address of welcome which contained interesting statistics on facilities, operating methods, budgets and other financial features of the institution.

Technical sessions on Friday were featured by presentation of papers and discussions on the practical aspects of nodular iron; basic cupola lining; things we do not know about the nonferrous foundry industry; gates and risers for castings. Program for the day concluded with a conference dinner at the Smith House, where Prof. Howard F. Taylor was chairman, Frederick M. Fitzgerald was co-chairman and Jim Britt, ace sportscaster, was the featured speaker. The second day was devoted to a consideration of cupola practice with materials available today; welding, brazing and cutting of gray iron; foundry sand; variables in the coreroom.

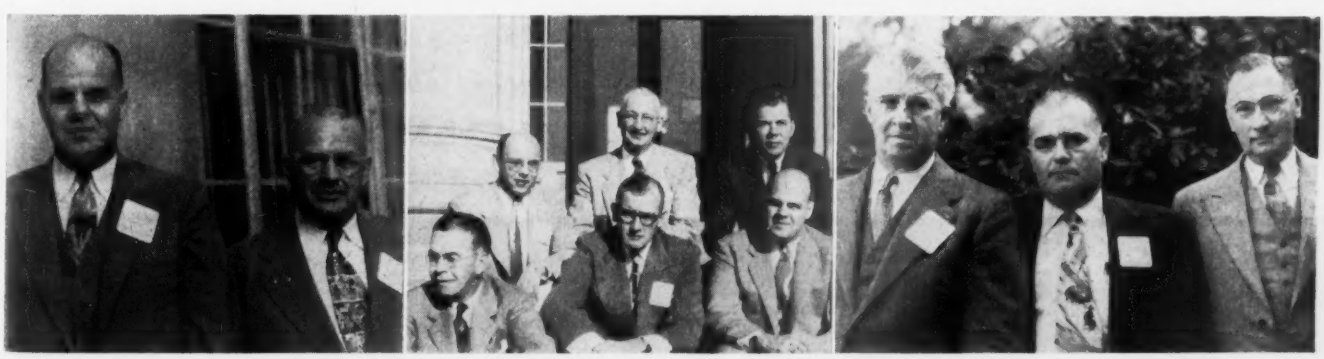
This last item on the technical program, presented by L. P. Robinson, vice president, Archer-Daniels-Midland Co., Foundry Products Division, was illustrated by a motion picture entitled "The ADM of Cores." It is a semitechnical discussion of basic foundry core practice. Purpose of the film is to bring about a better understanding of fundamental characteristics of core sands and core binders, thereby enabling foundries to improve the efficiency of all phases of core production. Mr. Robinson announced that prints may be borrowed without cost by schools, colleges, foundry groups or other interested parties.

At the opening session "The Practical Aspects of Nodular Iron" were covered by Thomas E. Eagan, research metallurgist, Cooper-Bessemer Corp. Grove City, Pa. Leroy M. Sherwin, Brown & Sharpe Mfg. Co., Providence, and Ahti Erkkinen, Builders Iron Foundry, served as chairman and co-chairman, respectively. Following a description of the material known as nodular iron, its composition and physical properties, the speaker claimed that the successful production of this metal requires greater care and attention to detail than ordinarily is required in producing ordinary gray iron, therefore the cost is higher. Melting and pouring temperatures are higher. Before attempting the production of nodular iron in the cupola, the foundryman should be familiar with and accustomed to the production of high class gray iron. In the foundry the metal is described as dead, freezes quickly and should be poured fast. In the question period following the formal presentation, the speaker explained in detail method of preparing and skimming the slag, also the method of adding the inoculant.

Under the joint chairmanship of Emil J. Laufer, Ductile Iron Foundry, and Felton C. Perkins, Jr., the Henry Perkins Co., Clyde Armstrong, superintendent Warren Pipe Co. of Massachusetts, stated that the basic-lined cupola in his plant, melting 180 tons in a 17-hour day, performed in a satisfactory, manner, showing marked reduction in sulphur content of the iron and in general overall cost of operation. The 90-in. shell is lined to 60 in. Magnesite brick next the shell, 5 in. refractory material blown on with a gun, and another 5 in. thickness of magnesite brick. The lining in the melting zone burns back approximately 6 in. in a 17-hour heat.

The tap hole and trough are formed with a carbon pitch paste, rammed in place with a bench rammer. It usually lasts 5 days. Cupola is slagged in front to maintain a well on the inside, a necessary factor in sulphur reduction. Low blast assures minimum erosion and a clean drop. At present the cupola charge

(*Continued on page* 222)



Shown at the conference, left to right, are: Left, Gordon Paul, committeeman, and L. M. Sherwin, session chairman, both of Brown & Sharpe Mfg. Co. Center, a group of committee members, and right: Harold Nelson, E. E. Pastreck, and Frank Elliot, session cochairman. All are from Westinghouse Electric Corp. Photos courtesy of C. A. Wyatt, Debevoise-Anderson Co.

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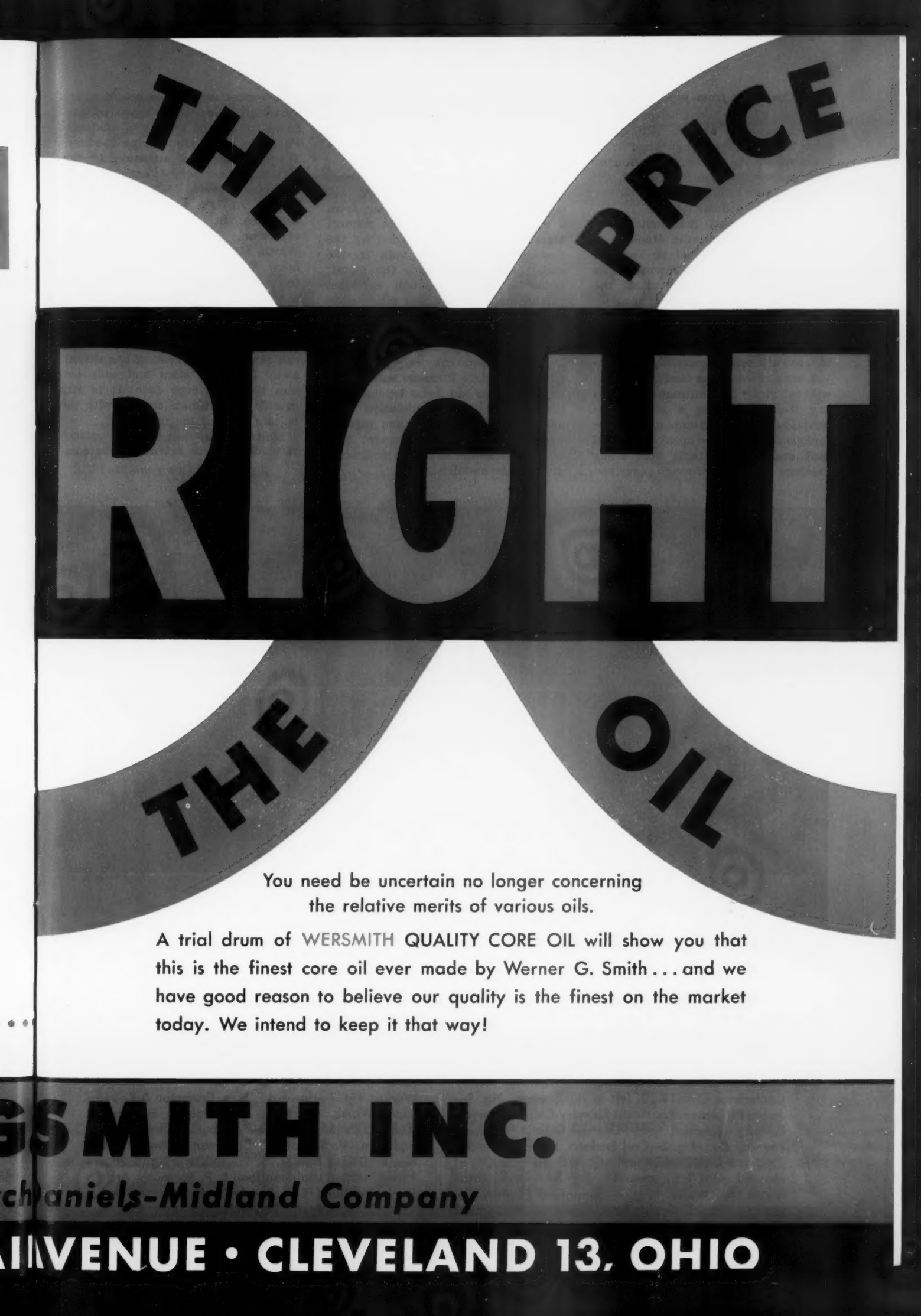

You need be uncertain no longer concerning
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A trial drum of WERSMITH QUALITY CORE OIL will show you that this is the finest core oil ever made by Werner G. Smith . . . and we have good reason to believe our quality is the finest on the market today. We intend to keep it that way!

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(*Continued from page* 219)

contains 27 per cent steel scrap. Larger amounts are in contemplation. The ladles are not lined with basic material. At the conclusion of the presentation, Emil J. Laufer, offered supplementary comment on the production of nodular iron.

Under the joint chairmanship of Frank Volpe, Somerville Machine & Foundry Co., and Fred B. Duncan, William Duncan Co., a discussion on things we do not know about the nonferrous foundry industry, led by William B. George, R. Lavin & Sons Inc., Chicago, held the close attention of a large group. Prepared primarily to promote oral discussion, the subject was presented in condensed form without going into intimate detail on any item. Following a general description of the sand employed in nonferrous foundries the speaker claimed that even with suitable sand many castings are lost through carelessness or lack of skill on the part of the molder who cuts the gates and runners. Where the gates form part of the pattern equipment they may not have been designed properly.

Many apparently unaccountable hazards are present between the crucible lip and the casting. Slag from a scab may develop in the runner; blacking or sand are eroded by the flowing stream; sand cuts in the sprue; slag enters with the metal; dross is formed through agitation of the metal. These and other common and uncommon causes of casting loss are part of every practical foundryman's experience. In the melting department coke, coal, gas, oil fired or electric furnaces will deliver either good or bad metal depending on the method of manipulation. The speaker outlined analysis and physical properties and other pertinent data on one aluminum and 11 typical brass and bronze metals.

In connection with a set of slides showing application of approved type gates for a wide variety of castings, Pat Dwyer, engineering editor, FOUNDRY, directed attention to the fact that the law of gravity is an important factor frequently overlooked. At this session Charles W. Hutchins, Standard Foundry, was chairman, and Raymon F. Meader, Whitin Machine Works, was co-chairman. While it is true that metal from a riser or feeder will flow into a casting to compensate for the natural shrinkage, the direction of the metal flow always is downward. If a casting is stripped carefully, one can see where the casting has shrunk away from the sides and ends and also from the cope face. It is still in solid and intimate contact with the bottom face of the mold.

Molten metal may be manipulated to a considerable extent, but in com-

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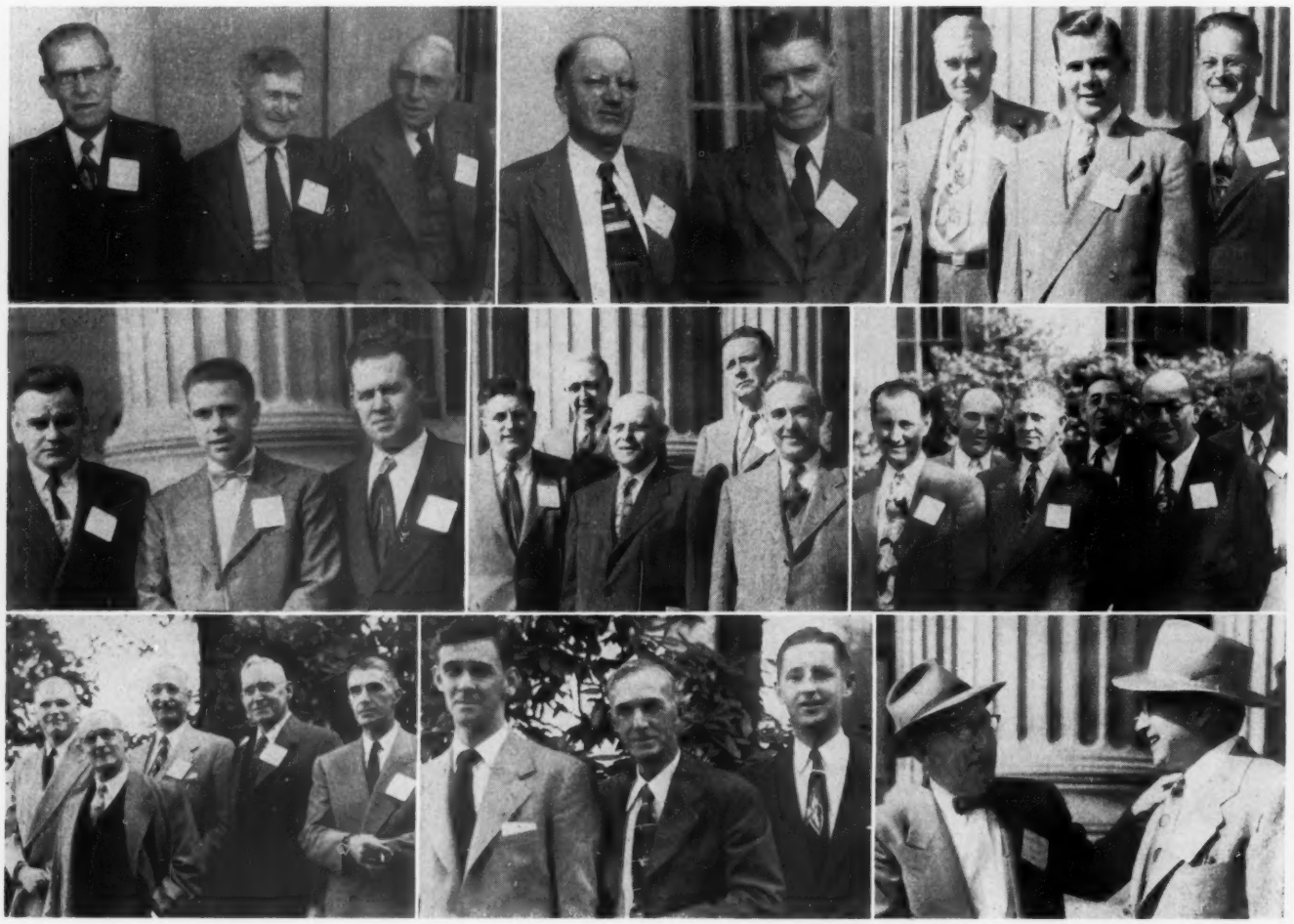

Others attending the New England Regional Foundry Conference Oct. 19-20, left to right, were: Fig. 1—James Dickenson, Fairmount Foundry Co.; Pat Dwyer, *Foundry*, speaker, and Charles Miller, Fairmount Foundry Co. Fig. 2—Carl Erickson, Franklin Foundry Co., and Clyde W. Armstrong, Warren Pipe Co. of Massachusetts Inc., speaker. Fig. 3—A group from Mystic Iron Works. Fig. 4—Springfield Foundry Co. group. Fig. 5—Group from Crompton & Knowles Loom Works. Fig. 6—Group from Whitin Machine Works. Fig. 7—Howard F. Nye, Crompton & Knowles Loom Works, speaker; Alex Haigh; Raymon F. Meader, Whitin Machine Works; Andrew Sproat and Don W. Sproat Jr., Chapman Valve Mfg. Co. Fig. 8—Group from F. S. Payne Co. Fig. 9—Harry Impey, session chairman, and L. P. Robinson, Archer-Daniels-Midland Co., speaker. Photos courtesy of C. A. Wyatt, Debevoise-Anderson Co.

Better Cores... Faster!

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TIME is the most valuable commodity we have. Save time in producing cores, and you save all along the line. Fuel, floor space, customer good will—these are a few items of saving or gain that result from the use of the faster drying, lower temperature baking characteristics of Delco 30 Series Core Oil.

HERE'S WHAT THEY SAY:

Representative foundries report as follows—

- "The big difference is in saving time and fuel in the oven, by cutting down both time and temperature —with no sacrifice of results in the finished core."
- "Results indicated 30 Series Delco Core Oil best suited our general overall work."
- "Best Core Oil I ever used!"
- "We are using one-fifth less oil, and the baking time in the ovens has been reduced approximately two hours."

Results like these appeal to every profit-minded foundryman. You can get similar results in your plant. Let our Cities Service representative aid you in applying the correct grade of Delco Core Oil for your specific requirements. This service is prompt, reliable, valuable—and *free*. Cities Service Oil Company, Chicago, Cleveland, Kansas City, St. Paul and Toronto; Arkansas Fuel Oil Company, Shreveport.

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BETTER PERFORMANCE in core boxes, whether blown or hand rammed, whether sand is washed and dried or crude.

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BAKES OUT AT LOWER TEMPERATURE, saves time, oven capacity and fuel.

HAS A CLEAN, PLEASANT ODOR.

MADE IN FIVE QUALITY RANGES accommodating all local foundry and core room conditions.

DELCO CORE OILS • ROSINAL LIQUID CORE BINDER • DELCO CORE AND MOLD WASH

CITIES SERVICE

(*Concluded from page* 222)

mon with other liquids it cannot be forced to flow higher than the original source of supply. The speaker claimed that top gating, wherever practicable, presents many advantages over any other type, still there are many instances—for example, ingot molds and other castings poured in a vertical position and gated at the bottom—that are perfectly satisfactory. In the speaker's opinion the ideal gate is one that will fill the mold at a speed that will promote solidification from the bottom, and still fast enough to prevent cold shuts on the face or other parts of the casting. In support of this opinion he quoted from a paper by E. V. Ronceray and presented at the AFS convention in Cleveland, May, 1930.

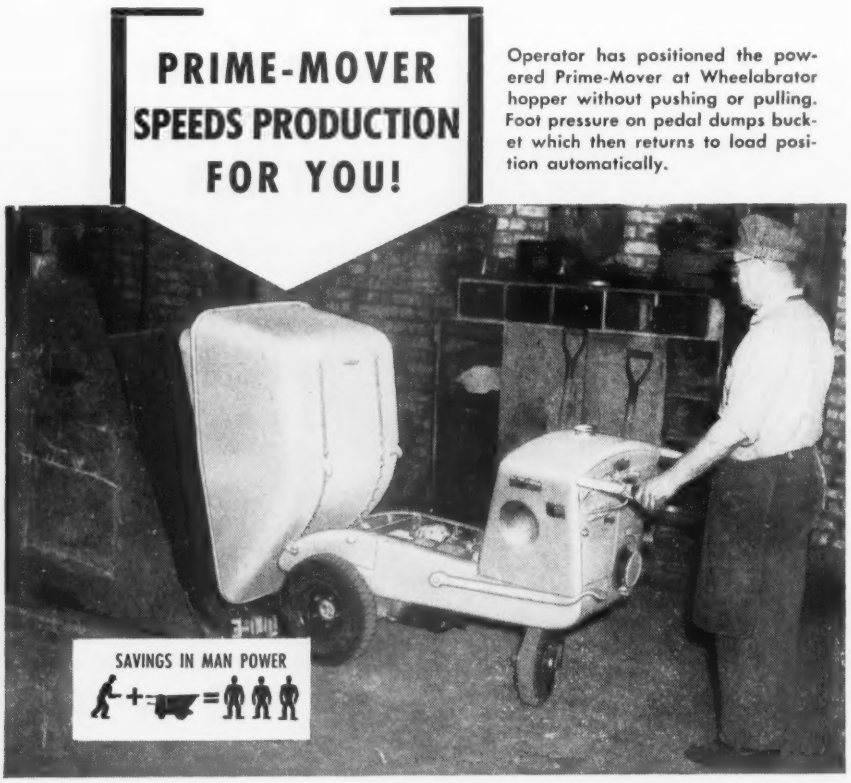
"Cupola Practice With Materials Available Today" was described by Warren V. Baker Jr., Draper Corp., Hopedale, Mass., under the joint chairmanship of Robert C. Walker, Whitin Machine Works, and John Morton, Saco-Lowell Shops. In his introduction the speaker pointed out that many variables affect cupola practice. Only rarely does the practice in one plant coincide perfectly with the practice in another plant. Where a metallurgist is in control the cupola practice may vary to some extent from that where a nontechnical man is in active charge of operations.

Cupola practice gradually has been growing more scientific, and getting further away from the old hit or miss methods. However, constant vigilance is required to see that the material charged is the exact material specified on the charge sheet. The speaker presented intimate detail of cupola operation in his plant with a daily heat of approximately 300 tons melted in three cupolas. Accurate knowledge and wide experience are essential in the selection of miscellaneous scrap and the utilization of the presently available pig iron.

Cast Iron and Steel

An illustrated description of the "Welding, Brazing and Cutting of Gray Iron," was presented by J. R. Craig, Linde Air Products Co., Division of Union Carbide & Carbon Corp., under the joint chairmanship of Walter M. Saunders Jr., and Frank Elliott, Westinghouse Electric Corp. Description included comment on difference between processing gray iron and steel; also precautions to be observed in preheating the casting. Several slides of typical shapes were shown to illustrate the speaker's comment on the necessity of preheating certain castings, while other castings do not need this treatment. Other comment and illustrations covered fusion welding; gas welding, oxyacetylene welding and arc welding. Also types of ordinary and special equipment devices.

Henry G. Stenberg, Draper Corp., and Howard F. Nye, Crompton & Knowles Loom Works, discussed the subject of foundry sand at a session presided over by Harry E. Gibby, Mechanics Iron Foundry, and Joseph B. Stazinski, General Electric Co. Description covered methods and equipment in the Crompton & Knowles foundry for the preparation, distribution and use of molding and core sand. Castings range in weight from ounces to 1500 lb, all made from one purpose iron melted in two 72-in. mechanically charged cupolas. Two grades of sand are used on the mechanical units, 100-110 fineness and 40-50 fineness, moisture content from 3 to 5 per cent. In some instances wood flour is added to the sand to prevent buckling. Coal dust is added to the facing sand used on the heavy floors. Sand is used at temperatures up to 140° F.



Operator has positioned the powered Prime-Mover at Wheelabrator hopper without pushing or pulling. Foot pressure on pedal dumps bucket which then returns to load position automatically.

PRIME-MOVER speeds production for you!

It is good fortune when a single piece of equipment performs so many jobs well—as prime-Mover does in a foundry. This fact has placed foundries at the top of our list among satisfied Prime-Mover owners. Foundry men say that Prime-Mover returns the investment within 60 days.

The ten cu. ft. bucket handles all kinds of bulk materials—castings—sand—coke—coal—scrap—knockout. The platform handles heavy flasks, cores, and large castings.

Dependable 5 H.P. air-cooled Wisconsin engine powers the Prime-Mover forward and reverse. Protected from foundry dust and dirt. Runs all day on a tankful of gasoline.

Prime-Mover supplies the capacity and the power to save the time and the wages of three men—often more. Anyway you add it up—Prime-Mover multiplies manpower. Your request for additional helpful data will be promptly filled.

THE PRIME-MOVER CO., Muscatine, Iowa

THE Bell PRIME-MOVER

Black-Light Inspection

(*Concluded from page* 103)

the breaking loose of penetrant from the surface and the sluicing away of the emulsified penetrant and wash-off of the part. This washing assembly has been surprisingly efficient in processing very complicated parts. It was previously thought that such parts would have to be run on a manual washing section also provided on the unit.

An additional feature of the wash section is the continuously moving roller curtain at both the in and out ends. This curtain, with flaps attached, nestles down and climbs over each part as it moves into the station on the conveyor. Seldom does any water splash or even droplets get past the curtain from the nozzles located within only 2 feet of the wash hood.

After washing, the part is carried through a wet developer station where the surface is coated with a film of powder suspended in water.

The drier is the next station. Here recirculating hot air continuously flows over the part to heat its surface and evaporate the water. The wet developer becomes a dry film on all surfaces of the part, by the time it passes through the drier.

Interpret Indications

The inspection section is last. Here the stainless conveyor carries the parts in front of inspectors under black lights (Fig. 2). The fluorescent indications of defects are viewed with portable hand black lights or the overhead lights as required. The indications are interpreted as to seriousness of defect, and rejectable defects set aside for disposal. Figs. 3 and 4 show typical fluorescent indications of cracks and burnt sand indications in two castings. These photographs were taken under black light.

Effective control of such casting defects has been achieved at Caterpillar by this method. Some casting lots are spot checked, while the more critical parts are checked 100 per cent. A reject in the spot check results in checking that lot 100 per cent.

Experience has shown that although the control of castings is more thorough through the use of Zyglo, an actual decrease in rejects is being realized. The reason for this is that our suppliers are becoming more quality minded through the intelligent use of the information on defects located. This improves foundry practices and reduces the number of defective parts cast.

At the Caterpillar foundry inspection of pilot castings and sampling of production runs allow the foundrymen to see immediately whenever one of the many variables in casting is out of control. This dictates changes in gating, pouring temperature, composition, sand etc., to pour only good castings and avoid the expense of scrap castings.

Rejection of castings in their rough state, before expensive machining operations have been performed, is sound economic thinking.

Incentive Compensation

American Management Association, 330 West 42nd St., New York 18, has announced another booklet in the financial management series, priced at $1.25. "Executive Compensation: Company Policies and Practices" covers five papers dealing with incentive compensation for executives; the bonus as an incentive in management motivation; non-financial executive incentives, how much an executive should be paid, and the rearmament program and the American economy.

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By VINCENT DELPORT
European Manager
FOUNDRY

TECHNICAL REPORTS—International Foundry Congress

CONCLUDING papers presented at technical sessions of the 1951 International Foundry Congress in Brussels are discussed here. Other congress papers were reviewed in FOUNDRY *for November.*

The four following papers were by American authors; two dealt with malleable iron. "Important Attributes of Malleable Iron" was by James H. Lansing, technical and research director, Malleable Founders' Society, Cleveland. The author emphasizes the property of malleable of good machinability. Other useful properties are resistance to fatigue, shock and corrosion. It also has a high yield point.

In his contribution on "Continuous Melting for Malleable Foundries," W. R. Jaeschke, Whiting Corp., Harvey, Ill., discusses the combination of the cupola with the air furnace in continuous operation. He enumerates the various factors that unfavorably influence operations and the means of counteracting these effects. He mentions that continuous melting can be effected with a combination of the cupola and the electric furnace, but the operation is difficult owing to the necessity of making additions in the electric furnace.

Dr. H. A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, gave a paper on "Statistical Control of Foundry Operations." Statistical methods can determine the probability of the quality of a casting falling below a certain minimum. Such methods result in a reduction in number of tests usually made. The author develops certain important principles relative to the mathematics of statistical investigations. He cites a number of cases where statistical calculations are possible and of great use in foundry practice.

"Surface Treating Gray Iron to Meet Specific Industrial Applications" was the title of a contribution by C. O. Burgess, technical director, Gray Iron Founders' Society, Cleveland. The author briefly describes the methods used to protect gray iron against corrosion, wear and oxidation, and coverings for improving the appearance of castings. While gray iron is, to a large extent, particularly apt to receive surface treatment, the methods of preparing the surface differ from those used for steel and nongraphitized materials, especially when tinning by electrolysis.

The many ways in which gray iron can be treated for surface protection, allied with its mechanical and other properties, enable this material to be used as a substitute for other materials that are now in short supply.

A number of papers dealt with various aspects of foundry operations and practice. The exchange paper of the Swedish Federation of Mechanical Engineering, Foundry division, was "A Study of the Design and Performance of Mold and Core Drying Stoves" by E. O. Lissell, foundry manager, Bjorneborgs Jernwerks A. B., S. Forslund, assistant foundry superintendent, Avesta Jernwerks, and S. Ryden, research engineer, foundry division of the Swedish federation. The paper is based on replies to a questionnaire sent to 115 Swedish foundries, and on experiments with an electrically heated drying stove with recirculation. The drying cycle for sands bonded with various types of core binders is discussed. Three stages are distinguished in drying: Bringing the charge up to about 100° C; evaporation at constant temperature; bringing the charge up to drying temperature.

Favor Forced Draft

In the first two stages heat exchanges and temperature are probably less important, while these factors should be well controlled in the third stage. Stove temperature should be kept within narrow limits when completing the drying cycle. Forced draft, with recirculation, is to be preferred to attain this. High combustion efficiency, low amount of excess air, and fuels that give a minimum amount of combustion products are preferred. A minimum gas velocity is necessary to obtain efficient heat transfer. A high load factor should be used for fuel economy, although this will increase the drying time. Maximum thermal efficiency seems to correspond with a definite rate of recirculation at a given load factor.

The exchange paper of Associazione Italiana di Metallurgia was "A Comparison between Sand-cast and Machine-cast Pig Iron," by A. Scortecci, W. de Micheli, M. Drufuca and A. Palazzi. The authors carried out tests to determine whether there was a sensible difference between sand and machine cast pig iron when remelted in the cupola. From the same blast furnace, the iron was diverted into two parts, one sand cast, the other machine cast; both were remelted in the same cupola under identical conditions. The tests proved that there was no practical difference between the two resulting cast irons.

J. L. Jones, the International Meehanite Metal Co. Ltd., England, and Fr. v. Bergen, of the Netherlands, presented a contribution entitled "The Effect of Burn-Out on Melting Conditions with Special Reference to the Water-Cooled Cupola." Starting from the assumption that burnout can be reduced to a minimum, either by

(*Continued on page* 228)

Meeting of the International Committee on Cast Iron Testing Methods at the International Foundry Congress, Brussels. Left to right: sitting—Vincent Delport and A. B. Everest, Great Britain. Standing—Dr. P. Bastien, France, committee president; G. Lambert, Great Britain; Prof. A. deSy, Belgium; Tom Makemson, honorary secretary, Great Britain; G. Henon, France; R. Reitsema, the Netherlands; F. W. Spies, the Netherlands; J. Drachmann, Sweden; G. Halbart, Belgium; Dr. A. Wittmoser, Germany (in front); J. Foulon, Belgium; Dr. E. Hugo Germany (in front); and E. Doat, France

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(*Continued from page* 226)
improving the heat resisting quality of the lining, or by improving the working conditions of the lining, the authors state that the second condition can be achieved by cooling down the lining.

The authors give the results of three series of tests carried out with a cupola, the melting zone of which was cooled by a water coil. The result was a minimum burnout of the lining while longer melts could be obtained with all the economical and metallurgical advantages resulting from a constant inside diameter of the cupola. The authors are now carrying out further tests with a small cupola cooled on all its height. Answering questions, Mr. Jones said that one man only was necessary to operate the cupola, apart from the charging platform; he hoped to arrive at continuous operation. In the discussion mention was made of water cooled cupolas used in the Netherlands and in England.

"An Experimental Study of the Efficiency of Insulation in a Drying Oven Made of Bricks" was a contribution by G. Ulmer, of the Centre Technique des Industries de la Fonderie, Paris. The author considers different insulating materials and where it is best to use them. For his tests he used an experimental stove of 9 cubic meters capacity. Fuel consumption was compared with the stove loaded and unloaded. It was found that good insulation and air tightness are paramount for efficiency. For thermal reasons, metallic walls are preferred in small recirculating core ovens. For large ovens for drying molds, bricks of suitable composition are better. By proper insulation, it is possible to cut down fuel consumption 35 per cent.

Ing. A. Cappon, Dok-en Werfmaatschappij Wilton-Fijenoord, Rotterdam, gave a paper on "Simplification of the Molding of Average Size Castings." The author describes a method of loam molding for castings of average size, mainly when the castings are of cylindrical shape, although the method can be adapted to certain other cases. The author calls the system "molding with joint separation facing upward." Cement composition replaces loam in the semi-permanent system described. By increasing the number of cores, and also their size within limits, molds can be realized economically and in a permanent way, by molds consisting mostly of cores and core prints.

Plan Mechanization

An American contribution was "Considerations on the Mechanization of Foundries", by W. A. Morley, foundry superintendent, Link-Belt Co., Philadelphia. The purpose of the paper is to guide the thinking of those contemplating a mechanization program, and to serve as a check list of the factors to be considered. The paper is based on the author's experience and study of methods used in foundries in the United States, and he believes that conditions arise in other countries where the principles expounded can be applied with the greatest advantage.

Also, from the United States was a paper from Lester B. Knight, president, Lester B. Knight Inc., Chicago, entitled "A Modern but not Mechanized Foundry Operation," giving a conception of a foundry conducted on modern lines and equipment, but not wholly mechanized.

In a paper, "Recent Developments in Foundry Equipment", Ing. Blankenhorn, Badische Machinenfabrik, A. G., Durlach, Germany, describes briefly the latest improvements in the field of foundry equipment, from the sand preparation plant to the cleaning department.

The problem of dust extraction and

Why beryllium copper? Berylco casting alloys are specified where high strength and hardness, good conductivity and excellent resistance to wear and corrosion are important. The heat-treatable feature of these materials offers property combinations not otherwise available. Significant foundry advantages include unexcelled fluidity and low pouring or handling temperatures.

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Ultimate Tensile Strength	150-175,000	140-165,000	95-120,000
Proportional Limit (0.002% Offset)	105-125,000	85-115,000	45- 65,000
Yield Strength (0.20% Offset)	120-155,000	110-125,000	55- 85,000
Elongation % in 2 in.	1-5	1-5	5-15
Rockwell Hardness	C40-45	C42-48	B92-100
Electrical Conductivity, %	20-25	18-23	45-50

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ventilation in foundries was dealt with by W. Muhlrad, Societe Prat-Daniel, Paris, in a paper entitled "The Collection of Dust and the Ventilation in the French Foundry Industry".

An interesting paper was "Melting Principle in the 'Metallurgical Blast Cupola' ", by R. Doat, Cie. Generale des Conduites d'Eau, Liege. The plant was described in the November, 1950 issue of FOUNDRY. The underlying principles of the system, as indicated by the author are: (a) Melting in a definitely reducing atmosphere avoids loss of metal and contamination of the slag by oxides. (b) With the water-cooled shell there is no slag contamination from the lining; the reactions between slag and iron are favorable due to high temperature and large contact surface. (c) From the angle of thermal efficiency, the metallurgical blast cupola can be looked upon as a cupola-gas producer.

Classify Foundry Defects

Four papers dealt with testing cast iron and foundry defects. Guy Henon, president of the International Committee of Foundry Defects, presented the exchange paper of the Association Technique de Fonderie, Paris, "A Classification of Foundry Defects." The paper explains the classification of foundry defects as adopted by the International committee at the Buxton meeting of 1950. The proposed classification is based on the aspects, shape, position, dimensions and, generally speaking, on standards which can be directly observed or measured. Each defect is identified by a symbol of four figures. The first figure gives the general class into which the defect can be included. The following figures narrow down the position of the defect in the classification. Each defect is given under its usual name (in French in this case), together with its causes and remedies, where possible.

Etienne Doat, Centre Technique des Industries de la Fonderie, Paris, presented a report of the technical committee of the Centre Technique on "The French Position as Regards Mechanical Tests for Cast Iron." In the specification established by the technical committee of cast iron metallurgy, tensile strength has been selected as the basic property, and five classes have been proposed. The test bars have been standardized corresponding to four thickness ranges from ½ in. to 2 in. The Fremont test has been retained as a complementary test.

"The Application of Ultrasonic Waves to Casting Inspection" was the title of a contribution by Prof. Paul Bastien, professor of metallurgy, Ecole Centrale des Arts et Manufac-

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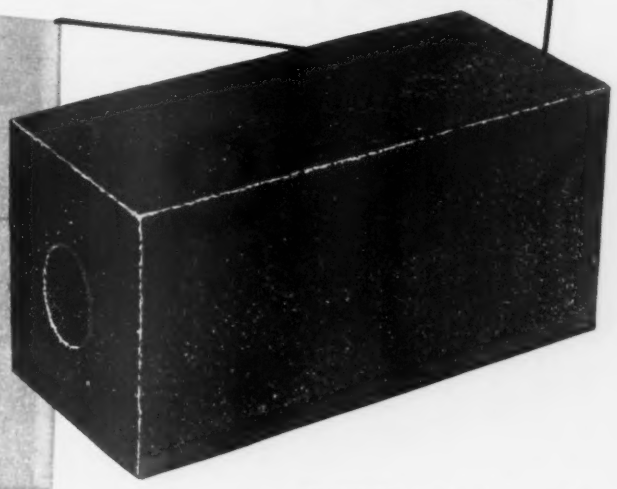

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tures, and Ecole Superieure de Fonderie, Paris. The author states that the ultrasonic tests are more complex for castings than for forgings. The principal causes of error to guard against are: Those due to the physical conditions of the emission; those due to the liaison between the apparatus and the casting; those resulting from certain definite relations between the wave length used and certain characteristics of the material being tested; those due to the physical conditions of the material and to the nature of the defect.

Use of x-rays was discussed by J. Oosting, N. V. Dikkers & Co., Hengelo, and B. Schuil, Rontgen Technische Dienst Overachie, Rotterdam, in a paper "The Application of X-Ray Control Methods to Castings." After giving some results obtained in the manufacture of pressure-resisting castings, with the use of the atmospheric riser, the effects of which were controlled by x-ray examination, the authors present a review of the possibilities of x-ray examination in the foundry. For research work, as well as for control purpose, x-rays can be used with success to discover certain defects, and eventually find the remedy.

In a paper "How the Laboratory and Research Organization Influence the Quality of Steel Castings," the author, P. Fobelets, Usines Emile Henricot, Court-Saint Etienne, Belgium, stresses the benefits obtainable from a correctly equipped laboratory for chemical, physical and x-ray control of raw materials and of the products obtained, for the correct selection of the grade of steel most suitable, the correct heat treatment, and for the finished casting.

Three papers were devoted to nonferrous castings. P. Mathy, Usines Montefiore, Brussels, contributed a paper on the "Utilization of the Microscope in the Nonferrous Foundry." The samples were polished either by abrasives or electrolytically. The author claims that valuable information can be obtained in metallographic inspection under the microscope in less time than by chemical analysis. In some cases, it is possible by this means to adjust the mix from one melt to another.

Avoid Gas Inclusions

"Gases in Bronzes" was the title of a contribution by Dr. W. T. Pell-Walpole, of the Tin Research Institute, London. The author has studied separately the effects of hydrogen, oxygen, sulphur, SO_2, steam, and gases emitted during pouring. Effects of gases are internal porosity, segregation of a brittle constituent, inclusions of sulphides and oxides, superficial porosity and oxide film. The main sources of contamination are: gases brought in with the metal charges, gases existing in the atmosphere of the furnace, and gases absorbed during pouring. Knowing these factors, it is possible to eliminate the defects, and the author enumerates the precautions to be taken and the treatment to which the metal should be submitted to arrive at the minimum contamination.

Frank Hudson, development and research department, the Mond Nickel Co. Ltd., London, and leader of the brass foundry productivity team from Great Britain, showed a film taken during the team's visit to the United States in the spring of 1950, and commented on what the team had seen.

Light alloy castings were the subject of two papers. "The Control of Light Alloy Castings for Jet Engines" was the title of a contribution by J Ophoven, Fabrique Nationale d'Armes Herstal, Belgium. The following control operations are described: Chemical control of raw materials; temperature control during the melt; de-

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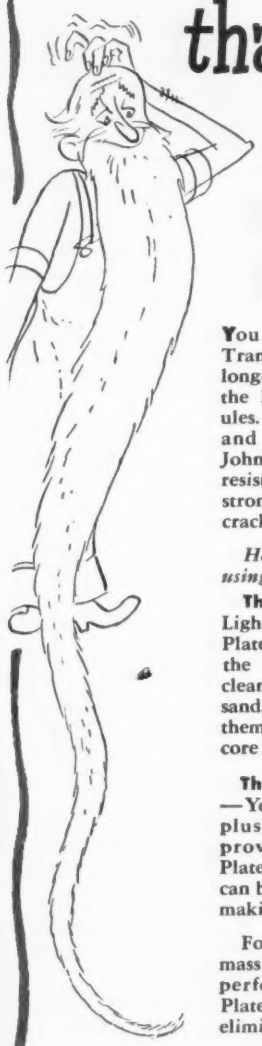

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gassing of the metal; control of the degassing stage; chemical analysis of the test bar for tensile strength; scaling; talc examination of the surfaces; milling test, x-ray examination of specimens.

Jean Gris, Societe Generale du Magnesium, Paris, contributed a paper "Seeking for Grain Fineness in Magnesium Alloys." Discussing the three processes for refining the grain of magnesium alloys, the author states: (a) Superheating can be used only for alloys where the basic addition is aluminum. (b) As regards the physico-chemical reactions, the author has examined the following agents: chlorine, iron chloride, magnesium carbonate, hexachlorethane and hexachlorocyclohexane. Results are given in the paper. (c) A description is given of an alloy containing 4 per cent Zn, 0.7 per cent Zr and magnesium prepared by Magnesium Electron Ltd., England, and which has been treated by the addition of zirconium; this illustrates the use of metallic additions.

Other papers presented at the congress were: "How to Use Economically the Core Blowing Machine," by G. Lambion, Usines Scapi, Vilvorde, Belgium. The author states that the minimum number of cores of one pattern required for economic use of a core blowing machine is not so high as might be imagined. Two Belgian contributions were: "Tentative Code for Good Practice in Pattern Design". A tentative standard was established by a commission under the auspices of Fabrimetal, in which raw materials and methods of pattern construction are classified, and recommendations are offered to the patternmaker.

Design Is Compromise

The other contribution is a "Code for the Correct Design of Foundry Castings," by P. Gillain, S. A. John Cockerill, Seraing. The author is the rapporteur of a commission set up by the Belgian technical association and the Belgian society of Mechanical Engineers. It is an attempt in collaboration between the engineer and the founder, and a number of principles are established for the design of castings, which would satisfy both parties.

Dr. Eugenio Mortara, of Italy, presented a paper entitled "Philosophy of Crystals," in which he points out that there is an element of mystery in the behavior of crystals, and he compares them with biological cells, with which there are certain similitudes, particularly as regards the heredity of crystalline forms in cast iron. He made a strong plea for the continuance of scientific studies in this field.

Prof. Ove Hoff, Polyteknisk Laereanstalt, Copenhagen, gave a brief review of "Technical Education in the Danish Foundry Industry." He covered the organization of training for apprentices, foremen and engineers in Denmark. The basic principle is to combine the theoretical courses at school with practical apprenticeship in the foundry.

A. E. Hook, Admiralty inspector of foundries, and J. J. Freitas, inspector of foundries, Indian Naval Dockyards, Bombay, India, gave a review of "Foundry Practice in the Indian Naval Dockyard, Bombay." A large variety of production is a feature of this foundry, ranging from iron castings up to 14 tons in weight, to small nonferrous castings, but also centrifugal castings.

The works open for visitation to the members of the congress included the modern foundries of Ateliers de Construction Electrique de Charleroi, the foundry of Compagnie des Conduites d'Eau, Liege, the steel foundry of John Cockerill, Seraing; and the continuous rolling mill installation of Ferblatil, for the manufacture of special sheets and tin plate.

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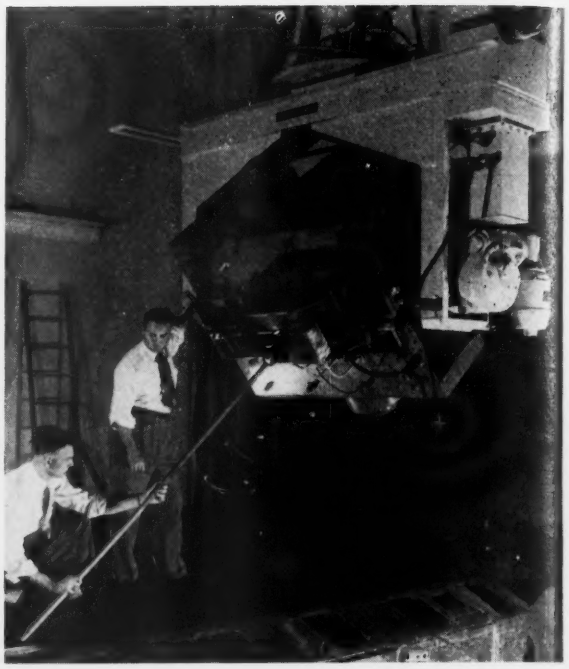
NEWS VIEWS

↑ **AWARD:** Rene Deprez (center) of Belgium receives the first annual Award of Honor from F. W. Spies (left), president, International Committee of Foundry Technical Associations, at the International Foundry Congress in Brussels. Mario Olivo, Milan, Italy, donor of the award, is at right.



↑ **BETATRON:** Continental Foundry & Machine Co. recently placed in operation this Allis-Chalmers motorized betatron for production line inspection of heavy ordnance equipment at its East Chicago, Ind., plant. The 20-million-volt unit is said to detect flaws as small as 0.02-in. in castings, forgings and weldments 1 to 24 in. thick, and can examine areas from 6 in. to over 20 ft long. It is mounted on a 30-ft-high bridge crane which leaves the floor clear for moving pieces.

→ **OPPORTUNITIES:** Foundrymen had a chance to see what they could make for manufacturers of defense items at the recent Military Business Opportunity Display in Los Angeles. Nearly 11,000 persons were attracted to displays of 82 prime contractors like Pastushin Aviation Corp., manufacturer of aircraft components.

← **FEF VISITORS:** Attending a recent meeting of the AFS Wisconsin Chapter were, left and center, George K. Dreher, executive director, Foundry Educational Foundation, and FEF President John M. Price, chairman, Ferro Machine & Foundry Inc., Cleveland. They are shown with Chapter President George E. Tisdale, Zenith Foundry Co., Milwaukee. (Photo by Walter V. Napp, Delta Oil Products Co.)

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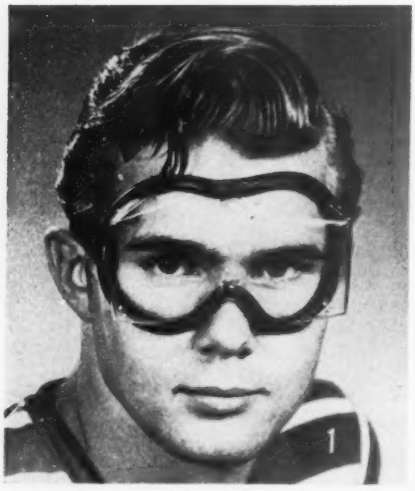
New EQUIPMENT *and Supplies*

For Additional Information on these Items Use Reply Card—Page 237

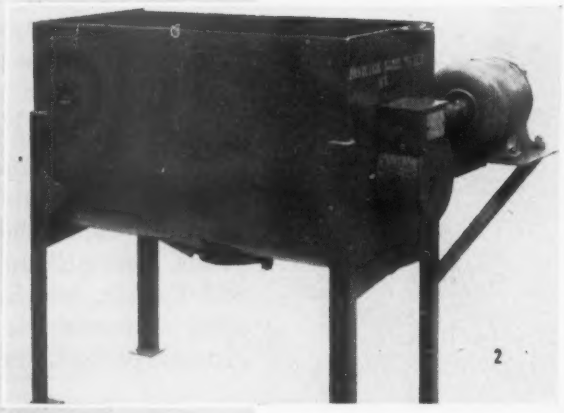


(1)—Goggle: General Scientific Equipment Co., 2700 West Huntingdon St., Philadelphia 32—Lightweight plastic goggle with clear or green lens affords wide angle vision and may be worn over prescription glasses. It has one-piece construction with molded rubber binding to fit natural contours of face. Elastic head band provides a snug fit and all-day wearing comfort. It is intended for use against flying particles, sparks, splashes, chips, dust and glare.

For More Details Circle No. 1—Page 237

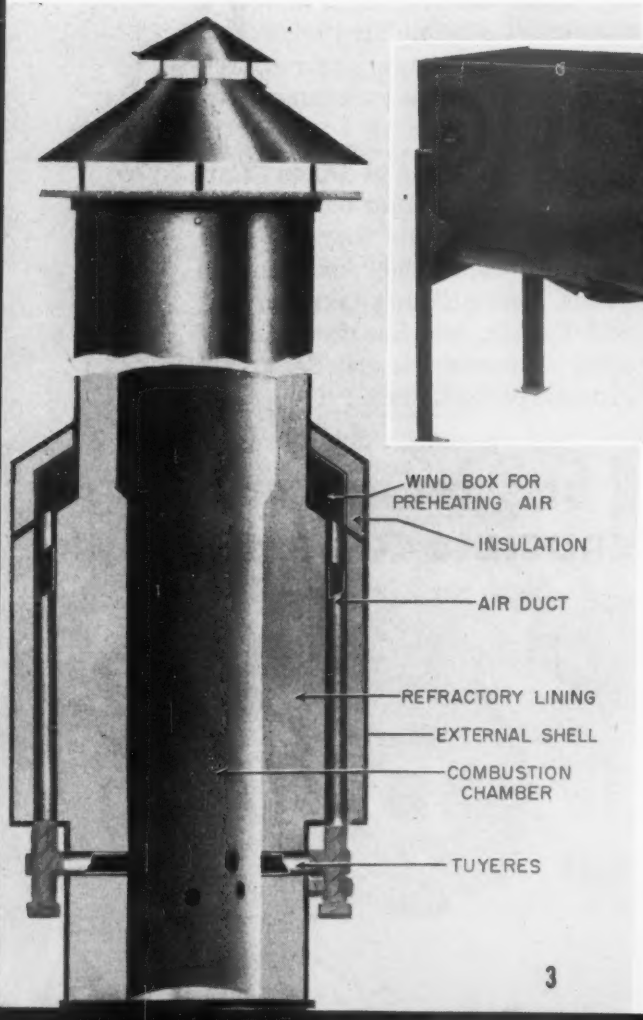
(2)—Sand Mixer: Budnick Mfg. Co., 1109 Michigan N.E., Grand Rapids 3, Mich.—Welded-steel core sand mixer requires no line shaft or sprockets as it is equipped with an electric motor and a worm gear drive. Except for a small breather hole, the gearbox is sealed completely; sand cannot interfere with the operation. Mixer has right and left angle steel paddles and one straight paddle, the former for mixing and the latter for pushing the sand through the opening at the bottom. Paddles are easily replaced. Two models are offered—one has tub size of 18 x 36 in., the other 36 x 48 in.

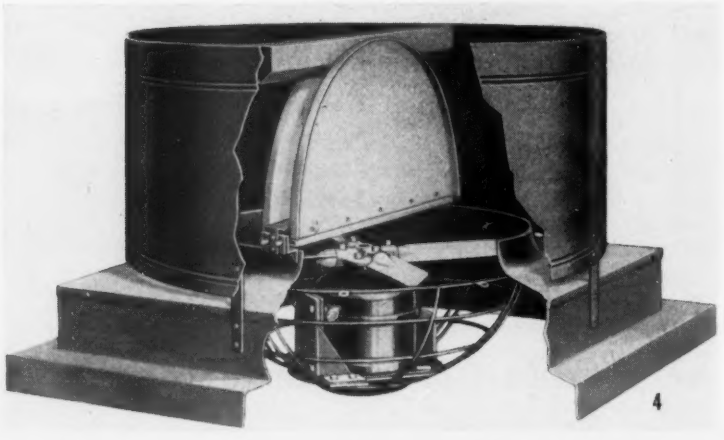
For More Details Circle No. 2—Page 237



(3)—Cupola: North State Pyrophyllite Co., Greensboro, N. C.—Cupola is designed to preheat its own air. A blower forces air into a windbox near the top of the combustion chamber for preheating. The hot air then is forced downward through insulated ducts into tuyeres that lead into the combustion chamber. Tuyeres are placed at different levels to insure a uniform flow of heated air and to help prevent bridging within the combustion chamber. Because no extra air preheating equipment is required, the cost of installing this cupola is said to be in the same price range as a conventional cupola. In some instances the special combustion chamber can be installed for use with a stack already in use.

For More Details Circle No. 3—Page 237





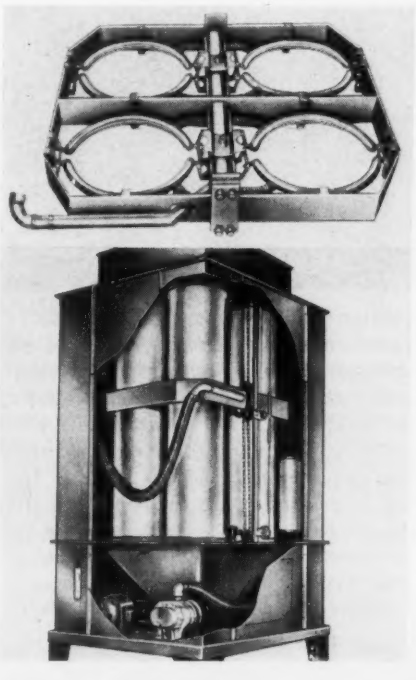
(4)—Ventilator: Swartwout Co., 18511 Euclid Ave., Cleveland — "Straight-through" type roof ventilator features simplified design and low overall height without sacrificing efficiency. Ventilator is open only when propeller fan is operating, the air stream being utilized to open and hold two semicircular halves of the damper while forcing unwanted elements out of the building. A streamlined fan ring directly above the square-tipped blade propeller is said to guide the airstream smoothly without back-flow. Weathertight at all times, the new unit is supplied in a wide range of sizes and capacities.

For More Details Circle No. 4—Page 237

Gloves: Washington Glove Corp., 106 North Water St., Milwaukee 2—Reversible plastic-coated glove is so constructed that it can be worn on either hand. Pliable and strong, the gloves have a soft, fleecy lining. They are said not to crack, scuff, or peel. The waterproof coating also is said to resist oil, gasoline, grease, acid, flame, chemicals, corrosion and abrasion. Gloves also have a nonslip finish and are washable.

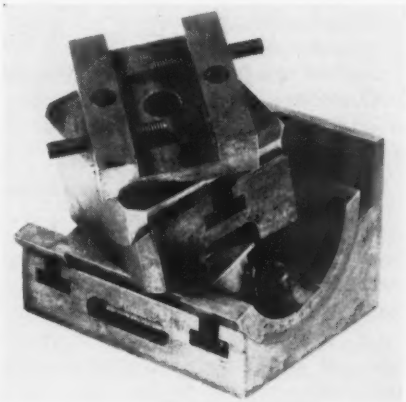
For More Details Circle No. 5—Page 237

Dust Bag Cleaner: Haws Engineering Co., 87 Gardner St., West Roxbury, Mass.—Self-adjusting blow ring for a bag type dust collector conforms to the filter bag's circumference and will automatically align itself, reducing wear and chaffing of the bag to a minimum. Filter bags in the dust collector are circled by rings mounted on a common carrier which travels up and down the bags, flexing them slightly and directing a high-pressure reverse air jet from slots in the inner periphery of the rings into the bags from all sides. The flexing and the air jet combine to dislodge dust which has accumulated on the insides of the bags. Dust drops down into the hopper by gravity and the down-draft of incoming air.



For More Details Circle No. 6—Page 237

Vise: Combination Vise & Jig Co., Orfordville, Wis.—Universal vise is designed to permit any compound angle to be ground without guesswork, and without the use of angle parallels. It is said that no mathematical computations, books or charts are necessary for efficient use of the vise, which is composed of a base on which is fitted a rocker. A sub-base fits on top of the first rocker; on top of the sub-base rests another rocker. On this last rocker is the tool holder which can take tools up to 1½-in. wide. All rockers are graduated; all sections may be locked in position. The



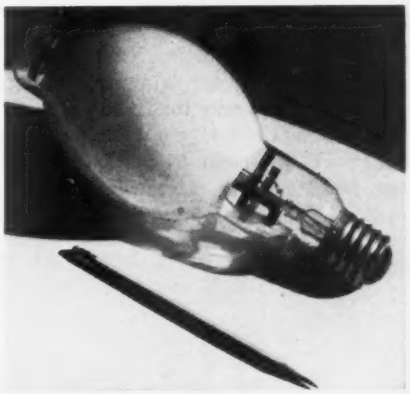
device is particularly adaptable to holding tools while being sharpened or manufactured.

For More Details Circle No. 7—Page 237

Fire Extinguisher: American-LaFrance-Foamite Corp., 10 LaFrance St., Elmira, N. Y.—One-quart, air-pressurized fire extinguisher discharges vaporizing liquid for extinguishing flammable liquid and electrical type fires. It requires no pumping and can be operated with one hand by anyone, it is claimed. Simply aim and squeeze the trigger. Extinguisher is recharged by pouring in more vaporizing liquid and pressurizing with any standard air chuck as commonly used in gasoline service stations.

For More Details Circle No. 8—Page 237

Lamp: Westinghouse Electric Corp., Lamp Division, Bloomfield, N. J.—A new light source, the 400-w fluorescent mercury-vapor lamp, is designed to provide a whiter light from a mercury-vapor source. Bulb has an inside coat of a phosphor that fluoresces red when activated by invisible ultraviolet light generated by the quartz arc. This tends to balance the spectrum to provide a light that is white enough for most industrial purposes. It has an isothermal shape



that provides an even operating temperature over the entire bulb wall. The new lamp will burn in any position and can be used in existing fixtures for 400-w mercury lamps.

For more Details Circle No. 9—Page 237

Filter: Air-Line Engineering Co., 4758 Warner Rd., Cleveland—Compressed air line filter also functions as a condenser in removing water and oil from air lines. It has a steel outer shell 6 in. in diam and 36 in. long and a steel inner cartridge 5 in. in diam by 24 in. long, loosely packed with Fiberglas. A cast aluminum head with inlet and outlet openings is bolted to a flange welded to the outer shell. Air enters the inlet opening and passes down between the inner and outer shells. Expansion of the air and the extensive cooling surface that is provided by the design cause any moisture that is in the air to condense and fall to the bottom of the outer shell, where it is discharged through the drain valve. The air then passes through the Fiberglas in the inner cartridge, which baffles out any remaining moisture without appreciably reducing line pressure.

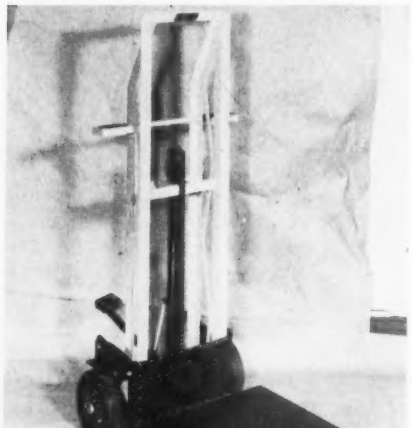
For More Details Circle No. 10—Page 237

Microscopes: Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—Laboratory microscopes have ball bearings and rollers throughout the focusing system. Other features include a low position fine adjustment and a mechanical stage with low controls that enable the operator, after setting the coarse adjustment, to rest his hand on the table and manipulate the other controls in a comfortably relaxed position. Substage equipment includes a variable focus condenser in a tubular mount which is said not to require a rack and pinion substage. A sub-

stage illuminator is available which can be used in place of the mirror or separately. Optical equipment for the new instruments includes a longer working distance and nondivisible 10X achromatic objective.

For More Details Circle No. 11—Page 237

Hydraulic Lift: Big Joe Mfg. Co., 184 North Franklin St., Chicago 6—All-purpose lift for moving, lifting and stacking heavy loads has a foot-pedal-operated hydraulic system which will lift loads 52 in. Lift pallet size is 16 x 25 in. Extension pallets, furnished at no extra charge, pro-



vide a lift pallet of 25 x 28 in. A smaller model hydraulic lift hand truck also is offered.

For More Details Circle No. 12—Page 237

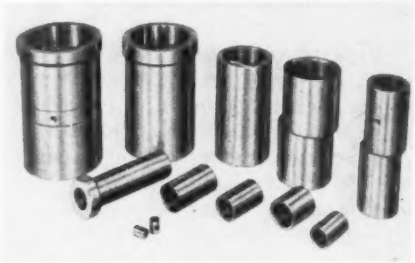
Air Vibrator: Cleveland Vibrator Co., 2789 Clinton Ave., Cleveland 13—Noiseless air vibrator has been developed for use at close proximity to employees and where noise is a major factor. Basically, the reciprocating action of a hard chrome-plated piston develops the vibrating action. This action is noiseless because the momentum set up by the piston is cushioned by a "pocket" of air at each end of the vibrator assembly. The vibrator weighs 2 lb, 11 oz and is 6½-in. long and 1½-in. wide.

For More Details Circle No. 13—Page 237

Heating Element: Syntron Co., 540 Lexington Ave., Homer City, Pa. Flat, sheathed electric heating element is designed for use with tanks, ovens, dies, driers, and for immersion in liquids. Unit provides flat surfaces for contact heating and a thin section for convection and air flow. It is readily bent and formed and is resistant to moisture and vibration. Element can be supplied with self-regulating characteristics where its wattage will vary inversely with the heater temperature. It is 5/32-in. thick and can be furnished in heated lengths up to 10 ft and in widths of 17/32 and 23/32-in.

For More Details Circle No. 14—Page 237

Bearings: Bronze Bearings Inc., 496 North Ave. E., Cranford, N. J.—Bronze bearings and bushings range



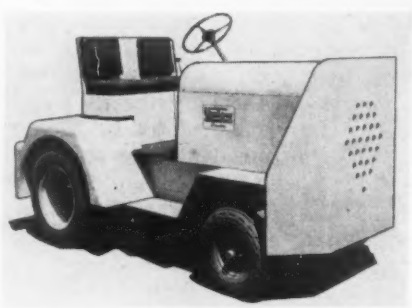
from small sizes no bigger than the end of a finger up to sizes as large as 24 in. diam. The variety of types offered include plain, flanged, split, or any combination. Finishes range from an accurate machine finish for precision application to a semifinish for rough work. They are cast from controlled bearing metals of the proper type for the particular use and incorporate special lubrication designs to meet individual requirements. Made to order flange types are available.

For More Details Circle No. 15—Page 237

Metallizing: Wall Colmonoy Corp., 19345 John R St., Detroit 3—Powder metallizing unit for spraying metals is said to have the following features: Light weight, eye level air gage, high capacity air filter, positive air and powder control valves, finger tip control trigger with lock for continuous or intermittent spraying, increased cooling chamber in head to provide steady operation and long tip life, and locked feed mechanism on carburetor to eliminate possible change in powder feed setting.

For More Details Circle No. 16—Page 237

Tractor: Hensel Green & Co., Nine South Clinton St., Chicago 6—Industrial tractor is 102 in. long, 65 in.



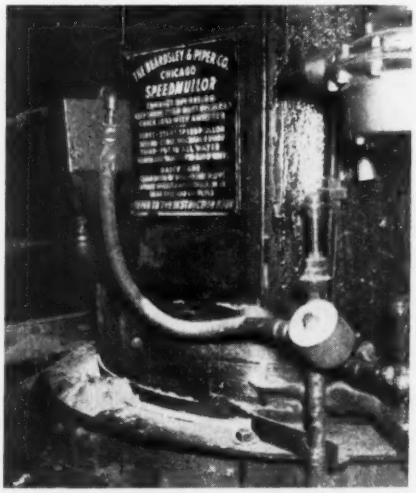
wide, and 66 in. high to top of steering wheel with turning radius of 118 in. It is equipped with 100-hp, six-cylinder engine which drives dual pneumatic tractor tread drive wheels with smaller pneumatic tired front wheels for short turning and smooth navigating over poor pavements and rough railroad yard crossings. It weighs approximately 6700 lb and will tow 100 tons on level with 5000-lb drawbar pull.

For More Details Circle No. 17—Page 237

Floor Material: Flash-Stone Co., 30 East Rittenhouse St., Philadelphia 44—Addition of pulverized natural rubber to an industrial floor material consisting of asphalt-rock limestone and cold asphalt emulsion is said to increase life span of the floor, reduce brittleness in subfreezing weather, provide greater traction when wet lessen the tendency to rut or wave under heavy point loads. Material is suitable for large area floor resurfacing with a relatively thin (½-in.) layer and for patching small damaged areas either in interior or exterior locations. It is factory mixed and requires no additives or processing before use. The complete aggregate also may be obtained with supplementary pail of asphalt emulsion for on-the-job mixing when desired.

For More Details Circle No. 18—Page 237

Pump & Meter System: Wilkinson Equipment & Supply Corp., 6958 South Wentworth Ave., Chicago 21—Core oil pump and meter system is operated by one valve which controls both the flow of oil and operation of the pump. The air-driven



portion of the pump is left under pressure at all times. When the oil shut-off valve is opened, the pump goes into operation; when the valve is shut, the pump is stalled but is under power ready for the next transfer requirement. At no time is the oil drum under air pressure. As the oil flows from the delivery line, it is measured in quarts by a meter of the type approved for dispensing liquids commercially. Advantages of

(*Continued on page* 240)

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

50. This Truck's Got It!

Towmotor Corp.—You buy more than transportation when you buy a Towmotor fork lift truck. Well, that's what it says in illustrated folder DM-2. Send for it and read how this one-man-gang can muscle in on your handling problems.

51. Motor Driven Compressors

Worthington Pump & Machinery Corp.—You can read all about company's line of motor driven compressors ranging in size from 75 to 3000 hp in 34-page brochure L-675-B1B. Illustrated and described are the horizontal duplex type built to operate at moderate speeds for heavy duty continuous service. Discharge pressures range up to 10,000 psi, and that's not just hot air.

52. Not Just Guesstimating

Hauck Mfg. Co.—4-page catalog 704A says that the Micro-Cam oil valve, a precision control instrument, eliminates "guesstimating" in oil burning. Could be! Get this folder and read all about these valves. It's got some capacity tables too.

53. Cutoff Machines

Tabor Mfg. Co.—Set of illustrated catalogs gives all pertinent information on Tabor-Brasive universal, type D10FWP, 3 hp series, and type C7½AF, C10AF, B5AC, B7½AC and D5AC cutoff machines. Specifications for all are given.

54. Spot Cars Quickly

Silent Hoist & Crane Co.—Electric and gasoline engine driven pullers can take the back-breaking work out of spotting railroad cars and barges. Complete data on these as well as on power winches are contained in illustrated bulletins 64A, AED-6A and AED-6B.

55. Handle It Overhead

Richards-Wilcox Mfg. Co.—You can straighten out your materials handling problems with Zig-Zag continuous power conveyors. Proportioned to products to be handled, conveyors meet requirements for light handling at low speeds, negotiate short radius horizontal and vertical curves and move equipment overhead where it is out of the way. Complete information is offered in 36-page illustrated catalog No. 2035.

56. Plenty Of Air

Schramm Inc. — Every foundry needs lots of compressed air. Facts, figures and application data on stationary air compressors fill 32 pages in illustrated bulletin C-50B. Answers are given in practical manner to questions regarding installation, operation and maintenance of industrial air compressors.

57. Crucible Melting Furnaces

Stroman Furnace & Engineering Co.—If you want latest information on manual tilt crucible melting furnaces for brass, bronze and aluminum, you should get 4-page illustrated bulletin No. 105. Oil and gas fired units are offered in red brass capacities from 90 to 1500 lb.

58. Convey Economically

Hewitt-Robins Inc., Robins Conveyors Div.—Whether it's hot or cold, wet or dry, lump or pulverized, smooth or irregular, bulk or packaged, you can handle it quickly and economically on the Vibra-Veyor vibrating conveyor. Units employing up to 200 ft of pan length on single vibrator are described in 4-page illustrated bulletin No. 135.

59. Skids—Boxes—Platforms

Powell Pressed Steel Co.—Give a real "lift" to your industrial power trucks with platforms, boxes and tote pans made of corrugated steel. Types designed to meet every material handling need are shown in 6-page folder No. 600. Get it now!

60. Fire Facts

Protectoseal Co. — Guidance for safeguarding property from fire and explosions is offered in 12-page illustrated manual and set of seven self-checking charts of hazards existing in shipping, finishing, assembling, fabricating, storage, maintenance and laboratory departments where flammable materials are encountered. Get your copy of this practical "Flammables Self-Checking Charts."

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

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61. Put 'Em Straight

American Wheelabrator & Equipment Corp. — You can get those crooked core rods back on the straight and narrow with models F, D, H and E rod straightener and shear machines described in 8-page bulletin 10-B. Models cover rod diameters from ⅜ to 2½ in. Get a copy and put yourself straight.

62. Use Your Overhead

American Monorail Co.—It's not over your head to understand that Monorail overhead handling equipment can help reduce overhead. Send for 56-page booklet C-1 which offers more pictures than "Life" of the many applications for this equipment in handling various materials and parts.

63. Single Line Buckets

Wellman Engineering Co.—Hook-on single line Williams type buckets are the subject of illustrated bulletin No. P3-116 which describes their construction and operation and tabulates both open and closed head specifications. Why don't you hook on to this one?

64. Aluminum Alloy Properties

U. S. Reduction Co.—Large 8½ x 11-in. slide rule type calculator quickly determines mechanical and physical properties and suggests applications for USCO aluminum alloys for sand, die and permanent mold casting. Send for this handy selector.

65. For Parting of Parts

Acheson Colloids Corp.—How are colloidal graphite dispersions used profitably in metalworking, glass, rubber and corrugated industries? This 6-page bulletin 427, will tell you. Parting compound is unaffected by heat up to 3500° F and prevents sticking and freezing.

66. Cupola Operation

Whiting Corp.—How can you make your cupola operation more efficient? Bulletin No. FO-1 will tell you. It's a 6-page folder offering pictures, diagrams and valuable suggestions for improving this type of operation. Send for it.

67. Cranes All Over the Lot

Coles Cranes, Inc.—Details of construction, outstanding features and specifications are given in 8-page folder E.W.F. for line of Coles Mobile cranes with capacities from 1¾ to 23 tons. Models suitable for many foundry operations can help you move it.

68. For Dry-Belt Grinding

Carborundum Co.—Small? Yes, but complete, 8-page booklet No. 2 gives you all the facts on a new coated abrasive cloth for dry-belt grinding. What it can do for you in finishing castings and other items is related. Better circle this number.

69. Foundry Flasks & Molders

Adams Co. — Yours for the "fl-asking" are not one but two catalogs which are descriptive of molding machines such as jolt squeezers, hand squeezers and accessories as well as wide variety of flask equipment. Request 12-page catalog 705 and 26-page booklet "Adams Flask Equipment."

70. Patterns For Success

Accurate Match Plate Co. — Get acquainted with the variety of aluminum pressure cast pattern equipment available by reading 16-page two-color brochure which covers match plates, cope and drag plates, core boxes and aluminum and white metal castings. Pictures and prices are included.

71. The Heat's On

Pittsburgh Lectromelt Furnace Corp.—62-page catalog No. 8 has a lot of hot dope on Moore Lectromelt furnaces for melting and refining iron, steel, nickel and copper. Sizes in order of decreasing capacity are discussed. You'll have a warm spot in your hearth for this one. Send for it!

72. Puts Bite Into Blades

Peerless Machine Co. — Are your gay blades down in the mouth because of poor teeth? Maybe 8-page booklet 60A can help you out. It describes and illustrates Tru-Tooth grinders which perform only qualified dentistry on the teeth of your power-hack and band saw metal-cutting blades.

73. Way To Weigh Air

Foxboro Co.—Oxygen required for each pound of coke used in cupola operation is regulated by air weight control which compensates for barometric and wind box pressure and temperature. Why not weigh air as you weigh iron, scrap and coke? Get facts in 12-page illustrated bulletin 268-3.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

74. Sounder Castings

"Insulation Increases Riser Efficiency" is 8-page reprint of article which shows how insulating riser sleeves give sounder bronze castings and increase metal yield. All the dope needed to use this technique in your plant is given.

75. Give Metal Pouring a Lift

Materials handling equipment to speed or simplify metal pouring operations is subject of 8-page illustrated reprint compiled by "Bob" Herrmann. Some excellent pointers are given. Yes, they can apply to your operation.

76. What About Cast Steel?

"Things We Know and Don't Know About Cast Steel," a 12-page illustrated reprint of C. E. Sims article, tells just what its title says. Currently accepted facts regarding melting, refining, degassing acid and basic slags, and deoxidation of steel are discussed.

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6	18	30	42	54	66	78	90	102	114
7	19	31	43	55	67	79	91	103	115
8	20	32	44	56	68	80	92	104	116
9	21	33	45	57	69	81	93	105	117
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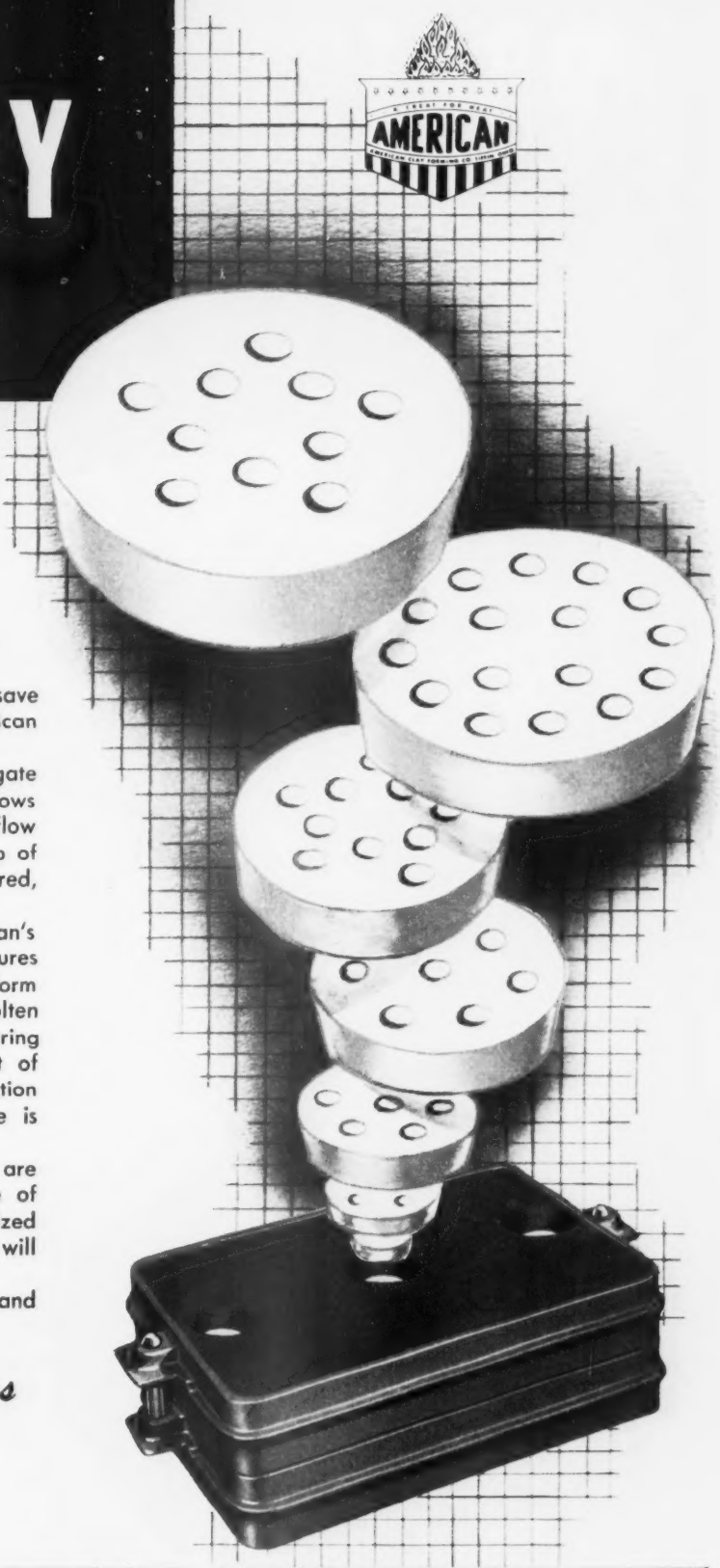
American's Ceramic Strainer Cores fit into the gate of the mold—they strain the molten metal as it flows through the holes of the strainer cores, making it flow smoothly into the mold. The slag remains on top of the strainer core and the result is an evenly poured, slag-free casting.

Machine made under high pressures, American's Ceramic Strainer Cores are fired to temperatures above 2400° F. They are very strong and uniform and are not effected by the heat shock of molten metal. The holes remain round and uniform during the pouring operation. Therefore, the per cent of rejected castings is held to a very minimum—production is increased and, of course, foundry labor time is definitely saved.

American's widely tested Ceramic Strainer Cores are available in eight sizes covering a wide range of requirements and are packed in convenient sized cartons for easy and quick handling. American will quote prices on special sized Ceramic Cores.

Write today for complete information, samples and the name of your nearest representative.

Assures Slag-Free Castings



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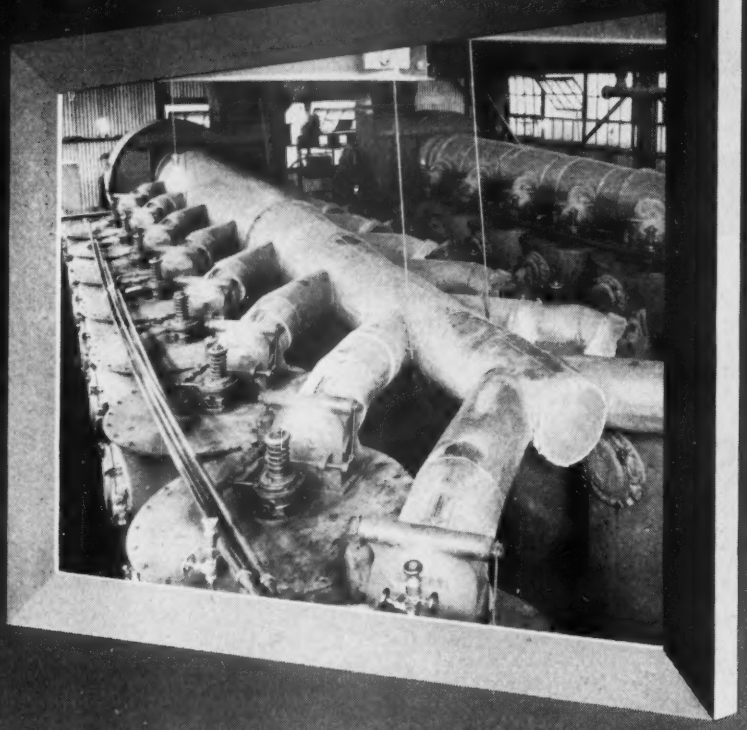


OF PROCESSING PROFITS

DRACCO AUTOMATIC FILTERS will prove your most profitable answer to fume or dust control and recovery under heavy-duty manufacture. For years, in many smelting, food processing and chemical plants they have provided top-efficiency operation under heavy dust burden or fume conditions where standard filters would prove unsatisfactory. Their continuous full-automatic operation results in additional economies in labor and materials.

Backed by over thirty-five years experience devoted exclusively to dust and fume control, DRACCO equipment is engineered and precision-built to fit your requirements **exactly.**

DRACCO Dust Control Engineers will gladly discuss your problem and demonstrate the advantages DRACCO can provide for your specific installation. Simply call or write DRACCO CORPORATION, 4063 E. 116th Street, Cleveland 5, Ohio, 415 Lexington Avenue, New York 17, N. Y.

DRACCO
DUST CONTROL EQUIPMENT
PNEUMATIC CONVEYORS • METAL FABRICATION

(*Continued from page* 236)

the system are claimed in time, labor and material savings, accuracy of measurement, operator convenience and elimination of the safety hazard created by spillage.

For More Details Circle No. 19—Page 237

Goggle: American Optical Co., Southbridge, Mass.—Rubber frame goggle is designed to provide a gas-tight seal and is recommended for gas, fume and smoke hazards. It is constructed with no ventilation slots in the rubber frame to prevent infiltration of air. When the goggle is perfectly fitted, a gas-tight seal results, it is claimed. Headband of the goggle enters slots in the outer goggle frame and not through a slit in the lens. Screw headed bolts on the front of the goggle are made of noncorroding stainless steel. Also offered is a new thermosetting plastic cover plate for protecting welding helmet windows. The plastic is said to possess surfaces comparable in smoothness, lustre, and chemical resistance to polished plate glass. It is more resistant to pitting than glass, will not discolor under ordinary welding conditions, and will not peel, crack, blister, or shrink in service, are among other claims for the product.

For More Details Circle No. 20—Page 237

Respirators: Willson Products Inc., Second and Washington Sts., Reading, Pa.—New line of Bureau of Mines approved chemical cartridge respirators includes styles for protection against low concentrations of many common industrial gases and vapors, as well as metal fumes, mists and dusts. They are said to fit the face snugly and comfortably, have exhalation valve positioned to minimize possibility of dust interfering

(*Continued on page* 242)

Why You'll Grind Better with Wheels

JOB-FITTED FOR YOU ALONE

Your Own Code No. and Formula Right on the "SPECS"

You set up a chain of procedure that has *one* objective—better, lower cost grinding—with your first order for Besly-Titan Abrasive Wheels or Discs. *Job-Fitting* starts with your requirements, the nature of your work, the results you want in grinding. Then, carefully balancing such things as wheel size and speed, blend of abrasive sizes and types, porosity and many other factors, a formula is established and given a code number. It identifies a wheel for you—to match your grinding needs *exactly*.

The value of Besly-Titan *job-fitting* is shown by the record. Foundries now using Besly-Titan Wheels are getting faster grinding with a lower total cost. It is only reasonable that *you* will get similar results.

Besly-Titan Wheels cost you no more than "stock" wheels. Once "specs" have been established, delivery in just a few days is routine. You re-order by code number—certain that every wheel will be *exactly* the same—*job-fitted* to your needs.

BESLY-TITAN

ABRASIVE WHEELS AND DISCS

Are "Job Fitted" for the Foundry

BESLY TITAN

CHECK UP ON THE COST-CUTTING, QUALITY-BOOSTING POSSIBILITIES OF BESLY-TITAN JOB-FITTED WHEELS. WRITE FOR FULL INFORMATION.

CHARLES H. BESLY & COMPANY

118 N. Clinton Street • CHICAGO 6, ILLINOIS

STANDARD CONVEYORS

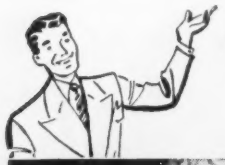
Cut Costs — Speed Operations — Give You

✓ REDUCED HANDLING TIME

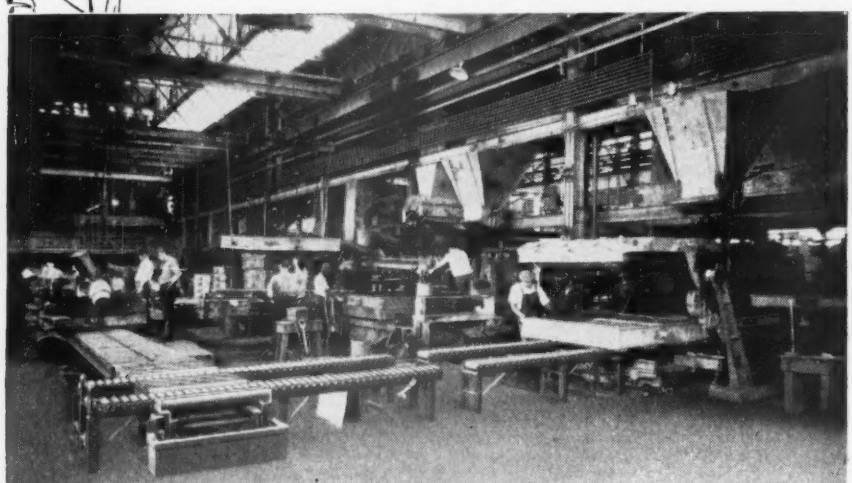
✓ UNINTERRUPTED SMOOTH FLOW IN PRODUCTION

✓ CAREFUL, SAFE HANDLING OF LIGHT OR HEAVY MOLDS

✓ BETTER STORAGE FACILITIES



✓ CONSERVE AND UTILIZE EXISTING FOUNDRY SPACE



STANDARD CONVEYOR COMPANY is able, through long experience to specify and build for every foundry handling need

Standard designs and builds conveyors expressly for foundry service — equipped with shielded and sealed bearings, protected against heat, dirt, sand, chips and grit for long-time, trouble-free operation.

Available in a wide range of sizes, weights and types — as complete systems — or individual portable sections.

Whatever your specific need, Standard is qualified by experience and facilities to recommend and furnish the right type of conveyor.

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General Offices: North St. Paul 9, Minn.
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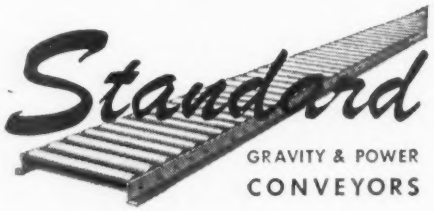
Engineered Conveyor Systems — Portable Conveyor Units — Spiral Chutes — Pneumatic Tube Systems

Send for Standard's special catalog "Conveyors for Foundries" — a valuable reference book illustrating and describing conveyor installations in leading foundries.



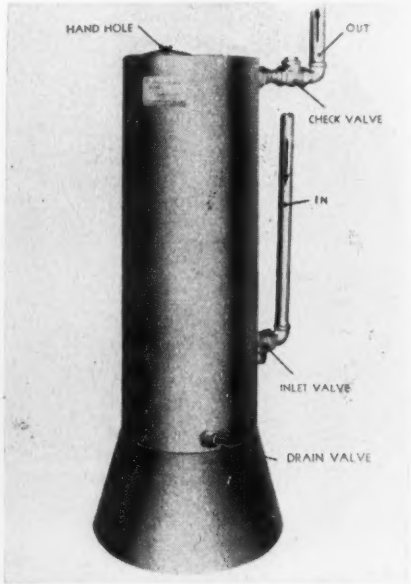
ENGINEERED FOR LOW-COST PRODUCTION

(*Continued from page* 240)

with normal operation and offer a choice of three cartridge sizes—60 cc 85 cc, and 100 cc.

For More Details Circle No. 21—Page 237

Air Drier, Filter: Van Products Co., 3734 West Twelfth St., Erie, Pa. —Air drier and filtering unit removes from compressed air and gases moisture, oil, dust, dirt, smoke, scale; reduces humidity below condensation point, and acts as a storage tank. It is self-cleaning, self-regulating and automatic. Only attention required is the addition of water-soluble filter material about once a month. This material is highly water absorptive when dry, wet or in solution. Unit is available in two models which deliver



air at 25 cfm or 200 cfm at 100 psi. They are cylindrical in shape, the smaller model being 19 in. high and 10 in. OD; larger model (illustrated) is 51 in. high and 18 in. OD.

For More Details Circle No. 22—Page 237

Vibrators: SPO Inc., 6449 Grand Division Ave., Cleveland 25—Pneumatically operated vibrators are designed for such applications as removing match plate patterns from sand molds, providing steady flow of powdered or granular materials from hoppers, moving granular materials through tubes and chutes, and fatigue-testing assemblies prior to installation. Five sizes are available with piston diameters ranging from ½ to 1¼ in. Feature of the vibrators is a corrosion-proof bronze alloy cylinder liner said to assure thorough and permanent piston lubrication, full-power starting, high-speed operation, and maximum service life. Operating on standard 80 psi air line pressure, the vibrators deliver from

(*Concluded on page* 244)

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How CHROMIUM BRIQUETS Increase Hardness and Strength of Cast Iron

Chromium briquets are made especially for the addition of chromium to cast iron in the cupola. The amount added may vary from small percentages up to as high as 15 per cent.

Function of Chromium in Cast Iron

Chromium is added to cast iron for the purpose of refining the grain and stabilizing the combined carbon content, thus increasing strength, hardness, and resistance to wear and abrasion. Even very small additions of chromium have a decided effect, and as little as 0.25 to 0.50 per cent will yield a great improvement in iron used for resistance to wear. A typical application is in automotive cylinder castings, particularly in heavy-duty truck and tractor work.

The stabilizing and refining effect of chromium is particularly useful to foundrymen producing castings of medium to heavy section. The slow cooling of such castings often results in weak, open-grained iron. Chromium in amounts up to 1.00 per cent will increase the stability of the structure of the castings and help to offset the effect of slow cooling in the mold.

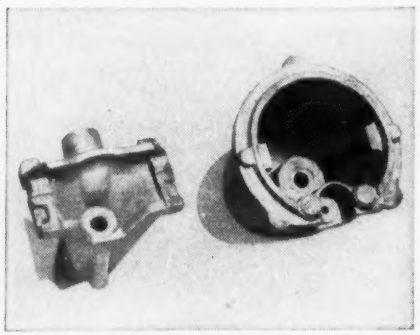


Fig. 1—These low-chromium iron castings, which are parts for a die-casting machine, are machinable, uniformly hard, and resistant to the effect of high temperature.

High-Temperature Service

The strong effect of chromium in stabilizing the structure of gray iron has made its use in iron subjected to high temperatures almost universal. Chromium in the range of 0.75 to 1.25 per cent greatly reduces the growth and warping that occur in unalloyed irons as the result of repeated heating and cooling. Chromium cast irons in this range of chromium content may be inoculated with silicon alloys to decrease the tendency to chill and, also, to assist in maintaining machinability. Such irons are adaptable to various high-temperature applications, such as melting pots, die-casting machine parts, grate bars, etc.

How Binder Protects Chromium

For the addition of chromium to cast iron, ELECTROMET produces briquets containing exactly 2 lb. of chromium each. The alloy is protected by a refractory binder, which has a high melting point and, therefore, helps to prevent oxidation of the chromium until it is melted and delivered to the crucible of the cupola.

The recovery of chromium from "EM" briquets is thus uniformly high, normally above 85 per cent, and it is easy to obtain the desired final chromium content. This is of particular importance when the limitations of hardness and machinability for a casting demand close chemical control.

Typical Briquet-Iron Mixture

The use of "EM" chromium briquets in the production of cast iron of low chromium content is shown in the table below.

Fig. 2—"EM" chromium briquets are hexagonal in shape, and each contains exactly 2 lb. of chromium. Notched briquets (right), which are easy to break in half, can be purchased for use when 1 lb. additions of chromium are desired.

The mixture given is for a medium-strength iron used for castings in which resistance to wear or heat is required.

Booklet Available

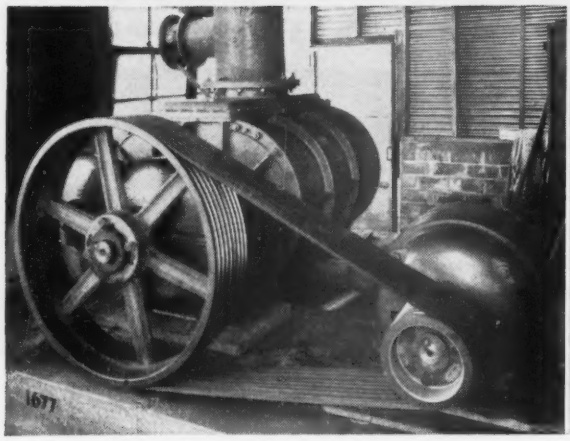
Typical briquet mixtures for other types of irons are given in the booklet "Briquetted Alloys for the Iron Foundry Industry." This booklet also contains information about "EM" briquets of silicon, silicomanganese, and ferromanganese. If you would like a copy, free of charge, simply write to the address given above or to the ELECTROMET office nearest to you. Offices are in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York and San Francisco. In Canada: Welland, Ontario.

The terms "EM" and "Electromet" are registered trade-marks of Union Carbide and Carbon Corporation.

Typical Briquet Mixture for Low-Chromium Iron

Base Charge			Alloys in Charge Material					
			Silicon		Manganese		Chromium	
Per Cent	Lb.	Material Charged	Per Cent	Lb.	Per Cent	Lb.	Per Cent	Lb.
20.0	200	Pig Iron	2.25	4.50	0.85	1.70	—	—
30.0	300	Return Scrap	2.00	6.00	0.75	2.25	0.57	1.71
30.0	300	Purchased Scrap	2.00	6.00	0.65	1.95	—	—
20.0	200	Steel Scrap	0.10	0.20	0.45	0.90	—	—
100.0%	1,000 lb.	Total Base Charge		16.70 lb.		6.80 lb.		1.71 lb.
Briquets Required		5 Silicon Briquets		5.00		—		—
		1 Silicomanganese		0.50		2.00		—
		2½ Chromium Briquets		—		—		5.00
		Total Alloys Charged		22.20 lb. Si or 2.22% Si		8.80 lb. Mn or 0.88% Mn		6.71 lb. Cr or 0.67% Cr
		Melting Recovery		x .90		x .85		x .85
		Final Iron Analysis		2.00% Si		0.75% Mn		0.57% Cr

Production depends on V-P-L



ROTARY

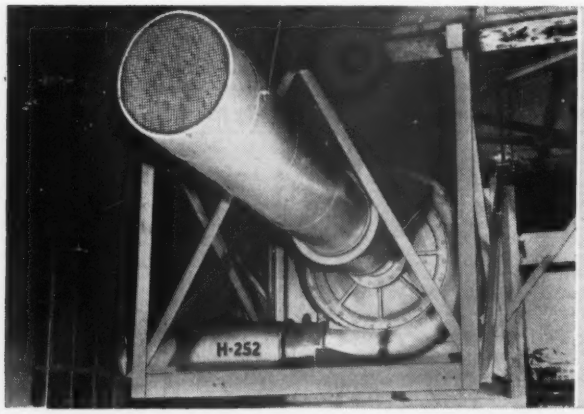
Motor-driven, Type RCS Blower for cupola service in southwestern foundry. Capacity 4,500 cfm.

Top performance of your cupola calls for a blower that can be depended upon to deliver positive Volume at required Pressure —and at Low power cost to keep down operating expense.

You'll be sure of V-P-L when you install R-C Centrifugal or Rotary Positive equipment. From this exclusive *dual-ability line*, you can match blowers to your plant's requirements. Then, with capacities from 5 cfm to 100,000 cfm, you can have the size which closely fits demands, with probable savings in time, cost, space, weight and power.

To keep production moving, use R-C Blowers and Gas Pumps with V-P-L. You'll be assured of the same fine, trouble-free performance which has been built into R-C equipment for almost a century.

ROOTS-CONNERSVILLE BLOWER CORPORATION
510 Madison Avenue, Connersville, Indiana



CENTRIFUGAL

Type OI Centrifugal Blower for cupola operation in large midwestern manufacturing plant. Capacity 6,300 cfm.

ROOTS-CONNERSVILLE

BLOWER BUILDERS SINCE 1854

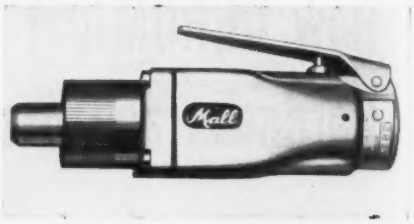
ONE OF THE DRESSER INDUSTRIES

(*Concluded from page 242*)

2200 to 6000 impacts per minute, depending upon piston diameter. Speed of vibration can be regulated by varying line pressure. Air consumption ranges from 6 to 9½ cfm.

For More Details Circle No. 23—Page 237

Pneumatic Grinder: Mall Tool Co., 7725 South Chicago Ave., Chicago 19—Midget size pneumatic grinder is designed for precision grinding small dies, castings and hard-to-get-at spots. Tool is 4⅝-in. long, 1¼-in. wide and weighs 12 oz. A choice of lever or button type throttles with a special collet guard allows operator to hold the tool close to the work, permitting fingertip operation with better balance in the tightest working areas. An arbor runout within 0.0015-in. allows accurate work where pin-point grinding is required. Eight precision collets are available to give a complete range of shanks from 1/64 to ¼-in. Rotary vane type air motor develops 26,000 rpm, and speeds can be regulated within a limited range to fit each application.



For More Details Circle No. 24—Page 237

Fog Gun: Bete Fog Nozzle Inc., 85 Pierce St., Greenfield, Mass.—Fog gun permits conversion of ordinary garden hose into a mobile and effective inside fire fighting weapon. Tap pressure of only 30 to 120 lb will produce an effective fog that will blanket and extinguish small fires. The fog is effective against practically any kind of fire—oil, textile, electrical, or wood. The nozzle has instantaneous trigger action and a positive shut-off. Additional uses include laying dust before sweeping, uniform dampening of foundry sand, cooling molds, and washing windows, machines, truck bodies, and plant floors.

For More Details Circle No. 25—Page 237

"We get 3 times the production with half the manpower"

A partial list of companies who have purchased THERMEX Electronic Core-Baking Equipment

American Brake Shoe Company
American Hardware Corporation
American Lava Corporation
Brugger Mfg. Company
James B. Clow & Sons
Crane Company
Drake Non-Clinking Furnace Block Co., Inc.
Ford Motor Company
Fundicao Tupy
Grand Haven Brass Foundry
Grinnell Corporation
Moline Malleable Iron Company
Mueller Company
National Malleable & Steel Castings Company
Ontario Malleable Iron Co., Ltd.
Phoenix Brass Fittings Corp.
Ronci Co., Inc.
Sterling-Faucet Company
U. S. Pipe & Foundry Company
Walworth Company

BEFORE this progressive foundry* installed THERMEX Core-baking Equipment, oven baking of 240 typical cores took two hours. Now, with electronic baking, the same job can be done in 40 minutes! And one man operates the THERMEX Core-baking Equipment, where two men were required with an oven.

Here are other advantages realized...

- 99% of cores now pass inspection, where reject rate formerly was 10 to 40%.
- "Dri-box", a plastic drier developed by Girdler engineers has proved perfect for the purpose.
- Requirements for core plates have been reduced by 75%—since baking time has been cut.
- Energy used varies with the requirement of the load—eliminates waste energy—unused power.
- A few standard mixes now take care of all cores.
- Baking tunnel is ready at the flip of a switch—no time is lost firing the oven.

Girdler has manufactured high frequency di-electric heating equipment in capacities from ½ ton to 15 tons per hour. You'll want complete data on THERMEX Electronic Core-baking Equipment. Write The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

*Name on request.

THERMEX—T. M. Reg. U.S. Pat. Off.

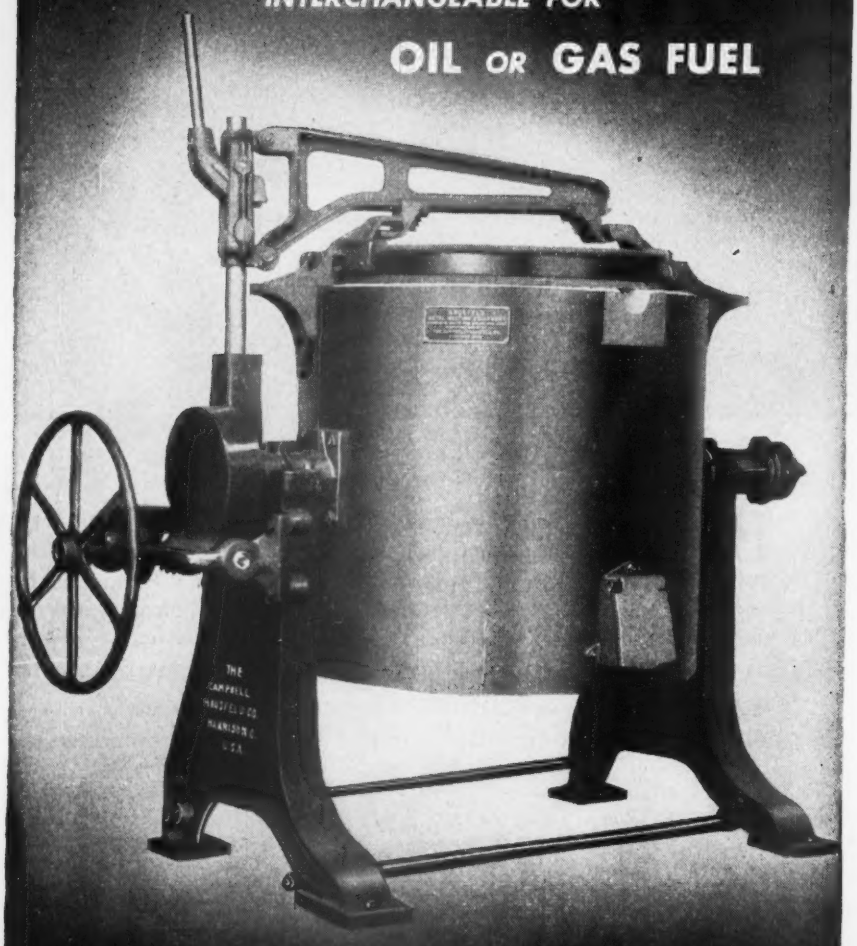
THE GIRDLER CORPORATION
Thermex Division

HAUSFELD

A FURNACE FOR EVERY NON-FERROUS MELTING REQUIREMENT

INTERCHANGEABLE FOR

OIL OR GAS FUEL



Built for Service

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

Community Relations

(*Continued from page* 119)

tivities.

Those foundries large enough to have a director of industrial relations may let him be directly concerned with specific activities and coordinating the program as a whole. In such cases, anything related to community relations should clear through him. He, in turn, should report to the president or the general manager on all matters concerning community relations. He may be responsible for organizing plant tours, and he should serve as the clearing house for company contributions to charities and local fund-raising campaigns.

It may be advantageous to obtain membership in organizations designed to provide services of an educational nature which might otherwise be impossible for small plants with limitations on their budgets and personnel.

Basic to any program of community relations are good employee relations. Some employers feel that by creating faith in the company and a knowledge that the employer is interested in each individual employee, the best possible community relations will be developed. Beyond any doubt, the best good will ambassadors any plant can have are employees who have faith in the company they work for. Actually there cannot be good community relations without good employee relations.

While it is not our intention at this time to discuss employee relations in detail, such things as fair treatment, pay, good working conditions, and an interest in the welfare and security of employees must be considered vital in any community-relations program.

How To Achieve Good Community Relations—

1. An active participation in community affairs will do much to create good will and an appreciation of industry's interest in the community.

2. By providing speakers for civic organizations, industry's story can be told and community support can be secured.

3. Small groups can always be accommodated for tours and special visits. To most people guided tours are fascinating and enlightening, and very often questions are asked which reveal a gratifying interest in production techniques.

4. Wherever plant facilities are available, they can be offered for use by community groups. For example, Boy Scout troops and Junior Achievement companies often meet on com-

(*Concluded on page* 248)

POURING VIA CLEVELAND TRAMRAIL

FASTER EASIER SAFER

plus tremendous cost savings

Seldom does new equipment installed in a plant pay for itself as quickly as Cleveland Tramrail in foundries. Whether in a gray iron, steel, or non-ferrous foundry, the advantages of Cleveland Tramrail are so great that the original capital expenditure is usually returned by the equipment in one year.

Pouring hot metal is one of the many important foundry jobs which overhead Tramrail makes faster, easier, safer. In addition, heat loss is drastically reduced because the metal can be conveyed directly from cupola to mould via Tramrail in considerably less time. Large unit amounts of metal can be handled per trip and need of transferring to smaller pouring ladles is obviated.

The same overhead Tramrail trackage, bridges, carriers, and hoists can also be used for all other foundry handling. Sand, delicate moulds, patterns, and castings can be transported quickly by Tramrail without interference with floor obstacles and traffic.

Let us show you what other foundries—hundreds of them—have accomplished with Cleveland Tramrail. Then you can settle in your mind whether this offers real possibilities for you too.

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THE CLEVELAND CRANE & ENGINEERING CO.
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CERTIFIED ABRASIVES
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can be used
OVER AND OVER AGAIN!
Switch to Certified Abrasives and keep cleaning costs down! Certified's Samson Shot and Angular Grit are made extra tough by a special automatically controlled hardening process. They wear longer, can be used over and over again . . . and assure fast, efficient, high-quality blast cleaning. Try Certified in your cleaning room and you'll see why it's first choice in hundreds of foundries!
All sizes graded to S. A. E. specifications
Experienced foundrymen say:
Always specify "Certified"
Accepted and used for over 55 years
PITTSBURGH CRUSHED STEEL CO.
Pittsburgh, Pa.
STEEL SHOT AND GRIT CO.
Boston, Mass.
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
MEMBER
FEMA

(*Concluded from page 246*)

pany premises.

5. Participation in local sports by company employees is an effective way to build good community relations. This is a good technique in small towns where sport activities in general may be limited.

6. Company support of community fund-raising activities can be carried out by direct donations and by organizing employees for their contributions. This is especially good if it is limited to one or two drives such as the Community Chest and the Red Cross. Too many such campaigns should be scrutinized carefully before approval lest they result in employee resentment of all fund-raising appeals.

These activities are stressed only because they are the easiest to organize and carry out. Other similar programs can be considered and approved as they lend themselves to the over-all program.

The American Way—Certain political ideologies seem to appeal, at times, to a distinct minority which, for some reason, has lost faith in democracy and its ability to provide adequately for all citizens.

However, there is a belief among thinking people that a faith in democracy is all that is needed to overcome any "ism" which threatens the American way of life. This need for more faith implies that there is also a need to demonstrate that democracy is best and that it *can* solve its problems in a dynamic manner.

What better way to demonstrate democracy's effectiveness than by industry's concerning itself with community problems and interests and working side by side with other citizens for the common good?

It is to our advantage to take the initiative and show that the phenomenal growth of our industrial might has increased our appreciation of our nation and the opportunities it affords all. We can teach a great lesson by demonstrating that unity—community relations—benefits all.

GIFS Publishes New Book

Gray Iron Founders' Society, 210 National City-East Sixth Bldg., Cleveland 14, has published a new manual, "Advantages of the Gray Iron Casting Process and Products," prepared by C. O. Burgess, society technical director. It shows how functional improvements stem from simplicity and the design freedom offered by castings and explains advantages of gray iron as a casting material. Copies are available at cost from the society.

Looking for Lightweight STRENGTH?

You'll find it in

FRONTIER 40-E Aluminum Alloy

● The trick today is to make the metal you use do *more.* Every product turned out in today's defense economy requires careful thought as to possible materials, fabrication methods, mechanical properties needed and elimination of *useless* weight.

One aluminum alloy that has met ALL the requirements desired by many manufacturers is FRONTIER 40-E ALUMINUM ALLOY. Because of its extremely high strength and corresponding light weight, plus shock and corrosion resistance, FRONTIER 40-E has unusual product adaptability. It is a free machining metal.

WRITE TODAY for FREE ALLOY DATA BOOK giving you engineering and metallurgical facts that can help you solve your alloy problems.

Remember — if aluminum can do it better — FRONTIER 40-E Aluminum Alloy can do it BEST!

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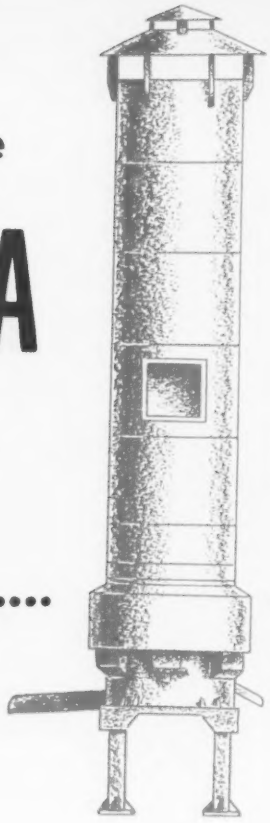
How to use the CUPOLA

By BERNARD P. MULCAHY
President
Fuel Research Laboratory Inc.
Indianapolis



Influence of carbon, silicon and other elements on cupola metal is discussed in this twelfth article of a series

EACH foundry, of course, must determine its own range of chemical analysis for the particular type of castings poured. This is usually arrived at over a period of time by joint agreement of the plant itself and its customers.

In most instances such a schedule will produce reliable indices of the analyses required. It frequently happens, however, that the customer, because of lack of proper understanding of his requirements, may demand an analysis too difficult to maintain except at very high cost to the producer. This can best be understood by a consideration of the effect of the various normal elements constituting cast iron.

The following comments are offered simply to emphasize the interrelationship of the factors we have been discussing throughout the entire series. These comments, of necessity, are very brief and are not intended for detailed information. Further discussion of these items can be found in reference books and the manufacturers' bulletins (alloys particularly).

Carbon—In considering carbon we must remember that this is the most important element in cast iron. It is also the most mobile, which means that its rate of absorption can be easily shifted upward or downward by: a.—Coke, kind and quantity; b.—Air rates; c.—Pig iron in mix; d.—Steel in mix; e.—Size and type of scrap.

A misconception frequently attached to this element is in the production of so-called "high strength" iron. In producing such iron it has been felt necessary to maintain a low carbon level in the range of 3.00-3.10. This idea was so fixed in the mind of the operators that this was accomplished in spite of other factors by:

1.—Maintaining high air rates.
2.—Maintaining low coke ratios.
3.—Using high percentage of steel in mix.
4.—Using high percentage of poor scrap in mix.

With the exception of item 3 all of the above factors were injurious to the metal.

Another instance of unbalancing an operation can occur where extremely high carbon iron is desired. The easiest manner of obtaining this, of course, is to charge an ingoing mix of high carbon content—for example, a high pig iron percentage. This, however, is costly and generally not possible these past few years because of the pig iron shortage. The question is, are these high carbon irons necessary in all instances, or are they the result of inertia in adjusting the analysis to that actually required.

The cheapest method of controlling carbon either at a high or low level is by means of proper combustion within the cupola.

We have repeatedly called attention to the influence of combustion on all of the oxidizable elements and particularly on carbon absorption. Because of this it must be emphasized that "carbon control" begins at this point and if these conditions are regulated to the degree of duplication, the other phases affecting carbon can generally be manipulated to the desired extent.

Silicon—Next to carbon this is the most important element in cast iron, and they both are intimately related in their solubilities. Unlike carbon, however, silicon can be added at will either in the cupola during melting (ferrosilicon or silvery pig) or to the stream. This flexibility gives the operator almost complete control with respect to this element.

The effect of silicon is well known, serving principally to harden or soften the metal in accordance with the requirements. When hard or strong castings are required the silicon is reduced and when soft, easily machinable castings are required the silicon is raised.

Silicon, however, is subject to oxidation and loss within the cupola. When this occurs it must be corrected because making up this deficiency by adding more silicon at the spout will not correct the overall state of oxidation of the metal.

Silicon is effective over a range within definite limits, and sometimes this is lost sight of, resulting in the use of an excess amount of silicon with no effect upon the castings.

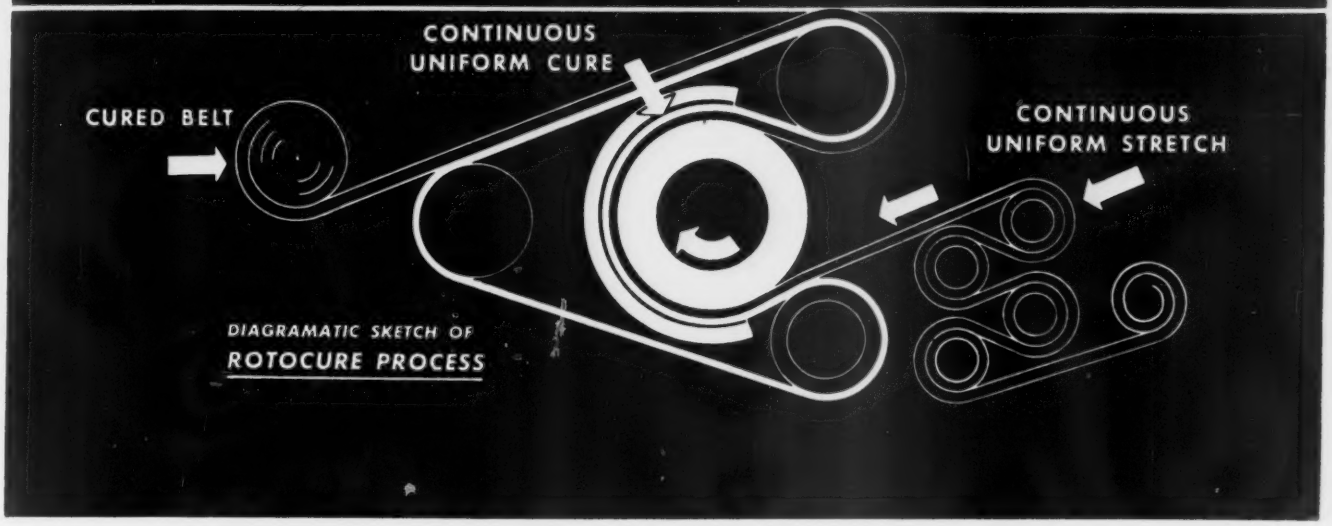
The effect of silicon or graphitization (dissociation of iron carbide, cementite) is dependent on rate of cooling (of the casting) as well as the carbon content of the metal. This means that section thickness also plays a highly significant part in the quantity of silicon required. Thick sections cool slower, permitting more complete graphitization; therefore, less silicon is required than in the sections which cool very rapidly.

Manganese—Generally in cast iron we think of manganese with respect to its action on the sulphur, that is the formation of manganese sulphide to counteract the injurious effect of sulphur. Additionally, however, we should also consider its effect on the iron when its content is above that required for neutralizing the sulphur. The amount of manganese required for neutralizing the sulphur is generally about six times the sulphur content.

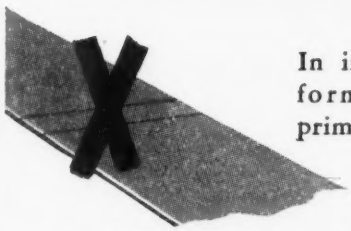
As manganese increases in content (over that required by the sulphur) it tends to harden the metal particularly as the carbon content decreases, as in high-strength (low C) iron. This

(*Concluded on page* 252)

They're CONTINUOUSLY Right!



(No "Start and Stop" Curing--No OCS* with **BWH ROTOCURED** Belts)



In industry, attaining uniformity of product is a primary objective of those who buy and those who sell. *But you can't get it in conveyor belts made by conventional flat press methods!*

WHY CONVENTIONALLY-MADE BELTS ARE VULNERABLE

In flat press curing, overcured segments due to press overlaps occur every 30 to 40 feet. These segments (2″ to 4″ wide across the entire belt) result because vulcanization is not continuous — sections cured earlier advance less than a full press length. The weakened structure due to overcuring invites operational weaknesses and is a major reason for early belt failure.

WHY ROTOCURE ELIMINATES THIS CAUSE OF FAILURE

As the accompanying diagram shows, BWH ROTOCURED CONVEYOR BELTS are made by a continuous, endless curing process. Weak segments due to overlapping can't *happen* because the belt is in constant, uniform motion.

WHY ROTOCURE PAYS OFF IN DOLLARS AND CENTS

Inherent in the Rotocure process are these 4 specific advantages:

(1) Increased belt flex life — as much as 40%.
(2) Elimination of mechanical distortion at the press ends.
(3) Constant, uniform stretch.
(4) Uniform, abrasion-resistant covers.

These advantages are giving BWH Conveyor Belt users longer life per belt, lower belt maintenance costs and worthwhile savings per ton in materials conveyed. Ask your BWH distributor or write us direct.**

**It will pay you also to get the facts on BWH Rotocured Transmission Belts which permit operation at lower tensions.

*Overcured Sections — present every 30′ to 40′ in all belts made by the flat press method. Only Rotocuring (continuous, non-stop curing) eliminates this major cause of belt failure.

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READ

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Anderson, Indiana

June 6, 1951

Mr. F.W. Knisley
Tamms Industries, Inc.
228 N. LaSalle Street
Chicago 1, Illinois

Dear Sir:

I would merely like to state that your Tamms #100 Cleaner is doing a very remarkable job in cleaning our coreboxes and driers.

It is the fourth such product I have used and is far superior to the first three. Overnight cleaning on driers which had not responded to two days' soaking in another product is evidence of the efficiency of your cleaner.

Very truly yours,

B. J. Lavelle

BJL/mj

Order this easy overnight cleaning method today!

TAMMS INDUSTRIES, INC.
228 N. La Salle St., Chicago 1, Ill.

(*Concluded from page* 250)

is accomplished by stabilizing the carbides.

Phosphorus—The general effect of phosphorus is to increase the flowability of the metal by lowering the freezing temperature.

In most irons an attempt is made to hold the phosphorus content below 0.30 per cent because of its effect on the iron in the higher range.

Some irons are very sensitive to comparatively small changes in phosphorus content, causing internal shrinkage and "draws" due to section thickness.

Phosphorus is quite beneficial to thin section metal in preventing chills; for this reason stove plate is generally cast with a high P content —0.50-0.60 per cent.

Sulphur—Sulphur in the form of iron sulphide will produce hard spots in the metal, particularly in thin sections. For this reason manganese is added to produce manganese sulphide instead.

Generally, producers of high quality iron attempt to hold the sulphur to less than 0.10 per cent with sufficient manganese to balance it. To do this, all materials must be carefully selected and coke should not be used to excess because of its source for this element.

(*To be concluded next month*)

Book Review

Metal Processing by Orlin W. Boston, cloth, 763 pages, 6 x 9 inches, published by John Wiley & Sons Inc., New York 16. Price $7.50.

This second edition of a well known textbook for college use has been completely revised. Elimination of a chapter on die castings and plastics in the first edition permitted addition of a chapter on surface quality, and appreciable enlargement of chapters on machinability, machine tool drives including electric motors and hydraulic pumps with controls and circuits.

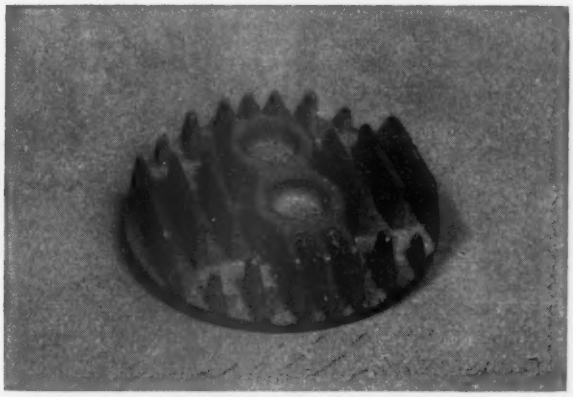
First chapter discusses steps involved in designing for production since final plant layout is determined from the manufacturing drawing with its tolerances, surface quality designations, analysis and form of material, machining operations, etc. Subsequent chapters treat in detail various types of machines, processes and factors involved so that the student develops ability to plan production of a part for various conditions of quantity and quality from the drawing. Extensive data are given to show cutting forces, power, tool life, chip formation, and surface quality as influenced by the properties of the material being machined.

VOLCLAY BENTONITE

NEWS LETTER No. 24

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

Metal Penetration



Sand in recesses or internal cores difficult to remove due to penetration of metal into the voids between the sand grains without displacing them. This forms a fused mass of metal and sand, which cannot be removed readily by normal shot or sand blasting. Certain forms of metal penetration are termed "burn-in" and "burn-on".

Causes:

DESIGN—Avoid sharp corners or fast changes in section size. Avoid any area where the sand mold or core section is much less than or surrounded by much heavier metal sections.

EQUIPMENT—Where flasks or flask equipment promote uneven ramming resulting in soft spots. Flasks too small or too "tight".

MOLDING—Soft ramming. Mold or cores improperly coated.

MOLDING SAND—Sand too coarse; high permeability; low flowability; not enough sea coal (if gray iron or malleable); low density; low green strength; high deformation combined with soft ramming; poor sand grain distribution; poorly mixed sand.

CORES—Sand too coarse. Cores overbaked or improperly coated. Softly made. Poor sand grain distribution.

MOLD CAVITY—Oxidizing atmosphere too great; gas pressure too low.

GATING—Location of gates which are uneven and promote localized hot spots. Long movement of metal in one area or spot. High ferro-static pressures. Discharge of metal from gates or sprue on to one local spot.

POURING—Pouring temperature too high, may cause spalling. High ferrostatic pressure. High metal fluidity.

Principal Cause: Sand too open, and soft ramming.

Usual remedy: Use finer sand and ram harder.

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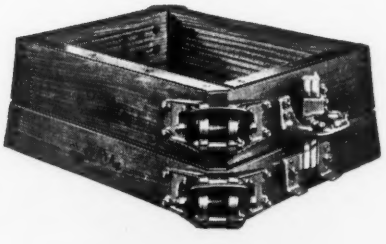
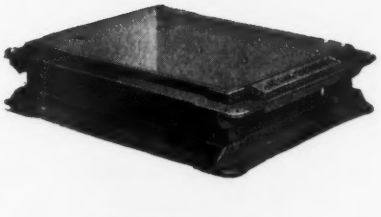
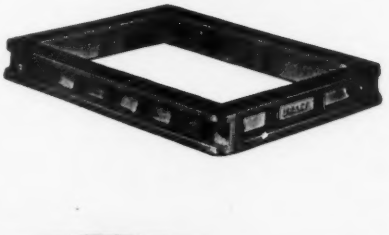
Portable Type

ADAMS

MOLDING MACHINES and CUSTOM-BUILT FLASK EQUIPMENT







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MOLDING MACHINES and FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

Casting in Open Molds

By PAT DWYER, *Engineering Editor, FOUNDRY*

AMONG the many jobs around a foundry demanding knowledge and skill, probably the average molder would be inclined to say that the molding of an open sand plate is the simplest. It looks easy. Nothing to do but level off a flat bed, bank a little sand around the pattern or templet, remove the pattern and pour in the metal. Any experienced foundryman knows that, with the exception of men who have had considerable experience on that class of work, few molders can be trusted to do the work properly. They seem to think that because the castings produced in this way usually are intended as part of the shop rigging or for some other purpose where smoothness of surface and accuracy of dimension are not essential, any kind of a mold will serve.

While it is true in many instances that a rough face will not condemn a casting of this character, several fundamental features must be observed if the casting is to escape the scrap pile. Since it is just as easy to make a mold that will produce a good, true smooth and clean casting as it is to make one that will produce a lopsided and lumpy casting, a molder who takes any pride in his trade should give the subject some consideration.

In this connection it is pertinent to remark that many castings usually made under copes, can be made in open sand molds at considerable saving to the foundry in time and labor. Flat back castings in which only one face is exposed in service, castings laid in concrete and many other examples which readily will occur to a foundryman engaged in the production of miscellaneous jobbing castings, can be made in open sand molds. They will be just as serviceable and present just as good an appearance as those poured under copes.

The three most common mistakes of the inexperienced in making castings in open sand molds occur in setting the straightedges, in preparing the sand, and in gaging the density to which it must be rammed.

Molten iron is a liquid and like all liquids will seek its own level. Therefore, unless the sand bed is perfectly level the resulting casting will not be of uniform thickness. It will be thicker at the lowest point in the sand bed and thinner at the high point. If the sand is not prepared properly—some parts too wet and some parts too dry—the metal will bubble and boil over the wet spots. Force of the flowing stream will wash a layer of dry sand in front of the stream. When the casting is lifted out of the mold it will resemble something blasted out of a stone quarry. The third item, tamping the sand, calls for the greatest discretion. If the face of the mold is too hard, the sand will scab and cause the iron to boil. If the face is too soft the weight of the metal will press it down. The resulting casting will be thicker than anticipated, swollen out of shape to an extent that renders it unacceptable.

Consider first the preparation of a sand bed for a plain flat plate. Later we shall take up some of the minor changes and variations necessary in case the desired casting has projections on the lower side, or other features requiring special treatment.

Level the Bed

Assuming for illustration that the desired casting is a plain plate, 4 x 6 ft, and 1 in. thick. Necessary equipment will include four bricks or wood blocks, several wood wedges, two straightedges about 7 ft long, planed only on one edge, and one parallel straightedge—one with both edges planed and parallel and about 6 ft long. A skilled molder can make a level bed by setting up four little piles of sand and adjusting the straightedges on them until the edges are level and parallel. At best it is a makeshift and risky method. Since bricks or small blocks are available in every shop there is no need to take any risks.

Having selected a suitable location, an outline is marked on the floor approximately 5 x 7 ft, or 6 in. all around more than the size of the proposed casting. The four bricks are set, two on each of the long lines close to the corners. One 7-ft straightedge is placed on two bricks and adjusted properly with a spirit level and one or two wedges. Sand is banked against the inside and a piece of pig iron or other weight is laid up against the outside at each end to hold it in place. Then the second 7-ft straightedge is set up on the other pair of bricks.

It is not necessary to try the level immediately on the second straightedge for the simple reason that it must not only be level, but also it must be on the *same* level as the first straightedge. The third or parallel straightedge is employed for this purpose. One end is placed on the first straightedge close to one end. The other end is placed in a corresponding position on the second straightedge. One or two wedges are inserted between the bricks and the second straightedge. The wedges are adjusted until the bubble in the spirit level resting on the parallel straightedge registers in the exact center. The same adjustment is repeated at the other end. It stands to reason that if the second straightedge is leveled from two points on an already leveled line, it also will be level. Typical layout is shown in Fig. 1.

Sand is banked against the inside and pieces of pig iron laid up against the outside as in the first instance. Space between the straightedges is filled with sand, but is not rammed. The upper surface is scraped off flush with the parallel straightedge.

In the event that a pile of sand is not available, or for any other reason that makes it advisable to make the bed flush with the foundry floor, two narrow trenches are dug the necessary distance apart, in the present instance 5 ft. The four bricks are disposed in the same manner and the straightedges adjusted as in the former instance. It is not necessary to employ pieces of pig iron to hold the straightedges in place. After they are leveled the trenches are filled with sand, tramped lightly on the inside and butt rammed on the outside. The intervening sand between the straightedges then is dug up with the shovel to a depth of about 12 in. The sand is not removed, but simply dug up and turned over. The object is to loosen it and see that it is in proper molding condition. From this point the preparation of the two beds is alike.

If the proposed casting is to have a smooth clean face, a thickness of facing sand will be needed on the bed. If not, ordinary heap sand will serve satisfactorily. In either case a sufficient quantity to cover the bed to a depth of ½-in. is passed through

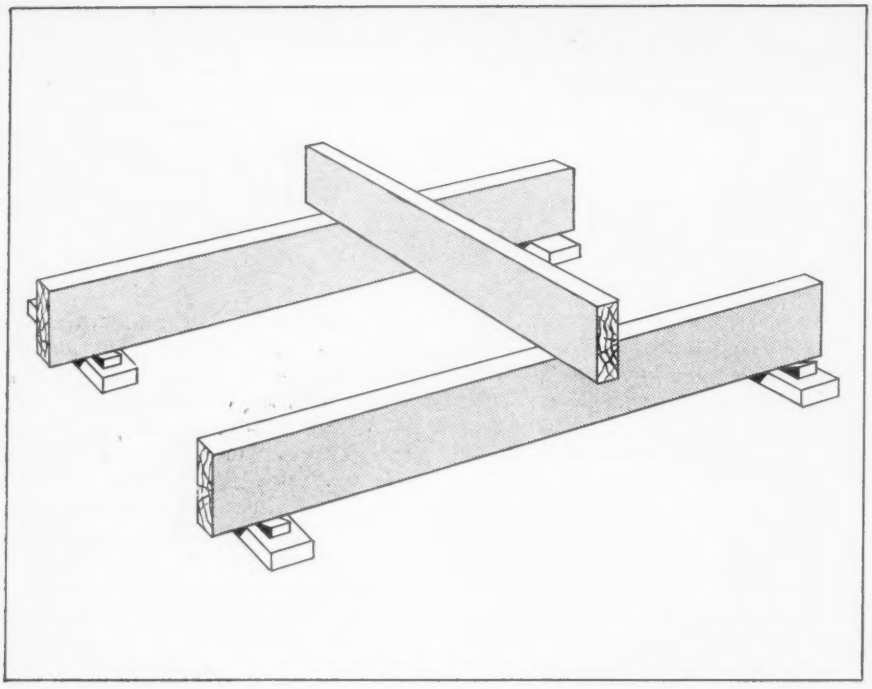

Fig. 1—Method of setting up straightedges level and parallel. After the space is filled with sand the surplus sand is beaten down with the upper straightedge

a ¼-in. riddle. The riddled sand is spread over the bed in the manner familiar to molders by giving the shovel handle a quick twist as the sand leaves the shovel.

To insure an even thickness of riddled sand all over the bed, the parallel straightedge again is employed in the following manner. A man at either end of the straightedge holds a gagger or a "soldier" about ½-in. thick between the lower edge of the parallel straightedge and the upper face of the straightedges forming the bed boundaries. The straightedge is pulled from one end of the bed to the other end to scrape the superfluous sand away and leave an expanse of nice, soft riddled sand standing ½ in. above the surface of the proposed bed.

The sand is beaten down and a firm surface secured by commencing at one end, gradually advancing and bringing the parallel straightedge down in a number of smart, rapid blows until the entire surface has been covered. On a narrow bed which can be straddled by one man, he can perform the operation alone. On a wide bed two men are required. One man holds his end of the straightedge firmly at a given point, allowing only enough freedom of movement for the man at the other end to rap the sand down for a distance of 12 to 18 in. Then the second man holds his end firmly while the first man raps down a similar area. After the entire bed has been treated in this manner, the straightedge is held and see-sawed back and forth, in a gradual advance from one end of the bed to the opposite end. The bed then is ready for an ordinary open sand rough casting. If the casting is to have a clean, smooth face the sand is slicked with the trowel and blacked as in ordinary green sand molding practice.

Generally the two long straightedges forming the boundary of the bed are removed after the bed has been completed, and the openings are filled with sand before arranging the patterns or templets on the bed.

In many foundries, particularly those devoted to the manufacture of large castings requiring many cores, a permanent bed is maintained in one part of the shop floor for making lifting plates, rings and core arbors. Usually the two sides of a permanent bed are defined by a pair of long, straight steel rails, set 8 to 12 ft. apart. In some instances the boundary walls are concrete.

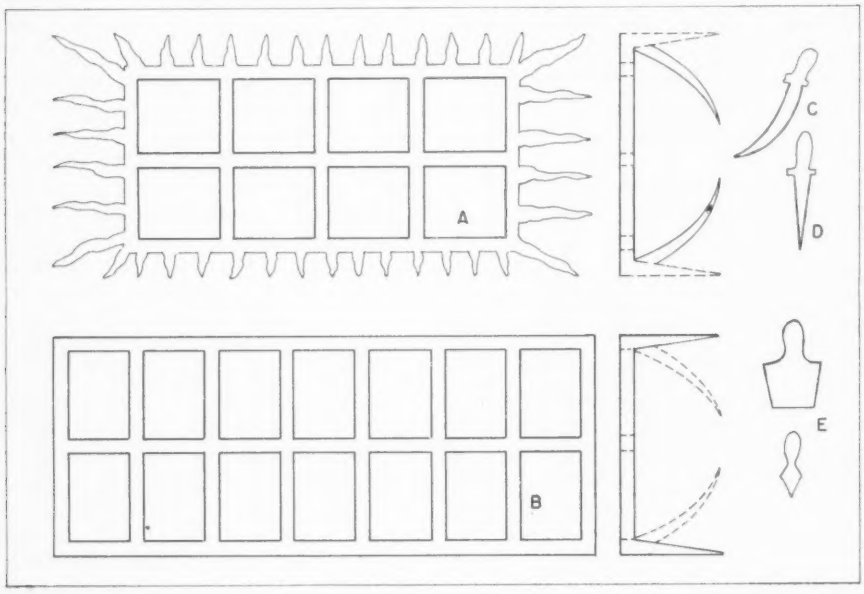

Fig. 2—Arbor shown at A is used where a solid arbor might interfere with contraction. Arbor B serves where contraction of casting is not a factor

Making Core Arbors

Core arbors are made by inverting the corebox and laying it face down on the prepared bed. It is tapped gently to produce an impression or outline on the sand, and then removed. A gate cutter, a thin piece of tin, brass or steel, is employed to scoop a channel in the sand corresponding roughly to the inside shape of the corebox. Reinforcing channels are cut at various points according to the coremaker's judgment and experience. The style of arbor shown at A, Fig. 2, for a cylindrical core is to be preferred to the arbor shown at B.

Provision for contraction of the casting must be made in all cores. This purpose is defeated in the arbor shown at B. In extreme cases an arbor of this type will rupture the casting. If the casting is not actually ruptured it will be distorted—oval in shape instead of truly circular. Another objection is that, in rubbing the two halves of the core to a bearing before they are pasted, pieces of sand become detached from the arbor and the assembled core requires a considerable amount of patching.

Instead of employing a gate cutter to scoop channels in the sand, some operators prefer to use a piece

(*Concluded on page* 258)

ove: **Bartlett-Snow Apron Conveyor** Handling Cast-
s from the Shakeout in a Large Production Foundry.

Shakeout in Large Southern Foundry Showing Dust Hood and Castings Handling.

Apron Conveyor in Cleaning and Inspection Departments in a Large Midwestern Malleable Foundry.

Castings Handling

stops profit leaks

● Bartlett-Snow castings handling and cleaning systems reduce the time—and cost—of handling castings from the shakeout to the shipping room. They permit the cleaning room and inspection operations to be synchronized to the tonnage passing over the shakeout — eliminate rehandling — and produce a controlled flow of castings, similar to the controlled flow of molding, pouring and cooling made possible with a run-around mold conveyor.

Complete facilities including casting coolers. The C. O. Bartlett & Snow Co., 6201 Harvard Ave. Cleveland 5, Ohio.

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FABRICATORS

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WOOD and METAL **PATTERNS**
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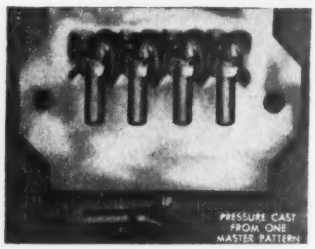

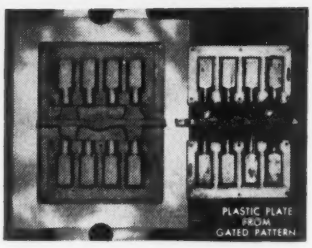

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FOR OVER 30 YEARS, Central has been serving the foundry industry with wood and metal patterns successfully. Also included in our services are fully machined patterns and core boxes of Aluminum, Magnesium, Bronze and Steel. Write for further information on our complete services and learn why our record and experience can benefit you!

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HYDRO ELECTRIC BUCKETS

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1½ yd. capacity

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Ask for our Bulletin "F"

VICTOR R. BROWNING & COMPANY, INC.
Chagrin River Road
WILLOUGHBY (CLEVELAND), OHIO

(Concluded from page 256)

of wood shaped like the peen end of a rammer as shown at E. This piece of wood is employed to stamp a continuous impression of the desired shape of the arbor. Many arbors are plain flat frames, but others are provided with prickers or dabbers of various lengths, either straight or curved to furnish reinforcement to the body of the core. A piece of wood sawed with the grain on the band saw is used for making the dabbers. It is shaped as at C for curved dabbers and as at D for straight dabbers. After the outline of the core has been stamped or scooped on the bed the dabber pattern is pushed down in as many places as may be required. Setting the lifting hooks in one of these arbors also is a job requiring care and discretion.

(To be continued next month)

Booklet Offers Guide To Defense Orders

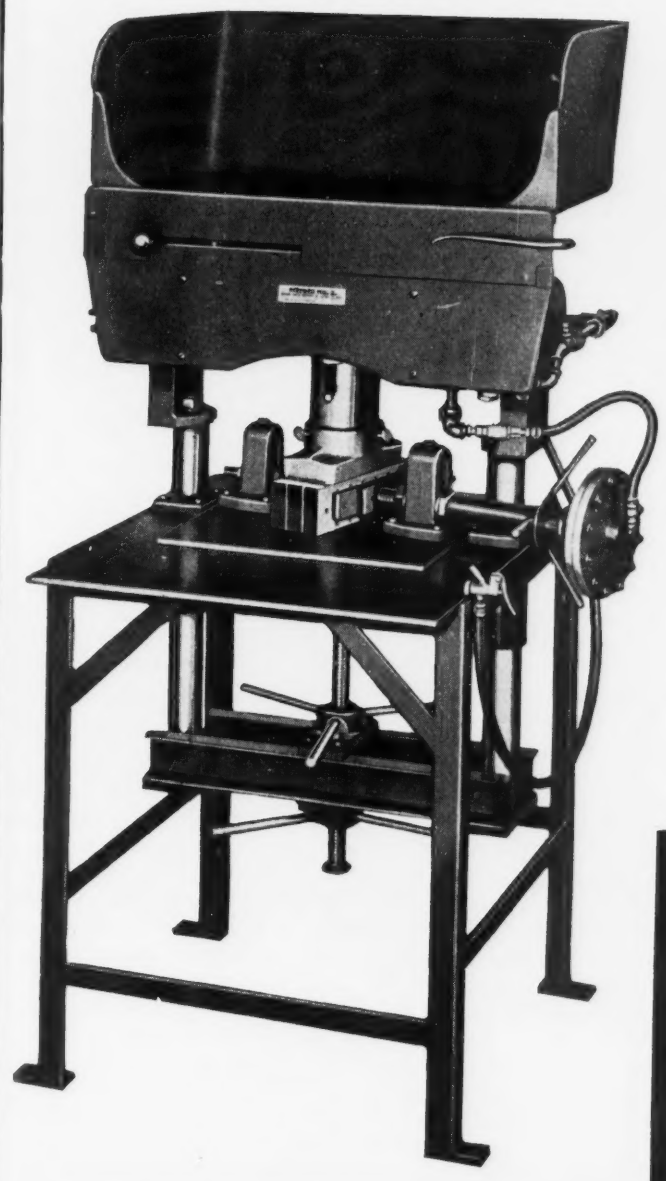
Department of Manufacture, Chamber of Commerce of the United States, Washington 6, has published a booklet entitled "Six Steps in Selling to the Armed Services." Discussion of procedures to follow in seeking defense orders is grouped under six headings: Know government buying procedures, make your plant capabilities known, find the right buying office, sell as strongly as in commercial practice, seek subcontracts as well as prime, and know when to visit Washington and when not to. Copies are available for 15 cents.

Firm Honors Old Timers

Ross Engineering Co., New York, held a dinner party Nov. 8 at the New York Athletic Club for members of its staff from the United States and Canada who have completed 25 or more years of service with the company. Each new member to the club was presented with an inscribed watch.

Present at the celebration were Catherine J. Cashman; Jane V. Falasca; S. W. Fletcher, company president; J. M. Petix; H. G. Rappolt; J. O. Ross, company founder, and R. E. Schultz from New York. W. R. Andrews from Montreal. W. J. Blake, Joseph Catanese, L. Van Deursen, V. S. Kozubal, G. M. Manry, W. M. Orchard, M. A. O'Shea, R. Sadwith, and F. J. Schultheiss from Brunswick, N. J. F. W. Partsch from Boston, and L. Degnan, R. H. Melin, and A. E. Montgomery from Chicago.

Redford CORE BLOWERS



REDFORD NO. 2 STATIONARY MAGAZINE TYPE CORE BLOWER . . . . .

New standards are being set with this machine, because every motion of your operator has been correctly evaluated to obtain a maximum of production with a minimum of effort.

8 OUTSTANDING FEATURES:

1. Large stationary work area.
2. Large sand supply hopper.
3. Stationary sand magazine.
4. Easy accurate locating of core boxes.
5. Quick change magazine heads.
6. Quick adjustment for different height core boxes.
7. Quick change, fully adjustable, vertical clamping attachment.
8. Actuating one handle clamps the core box, blows the core and releases the core box, in two seconds.

CAPACITY: Cores up to 5#

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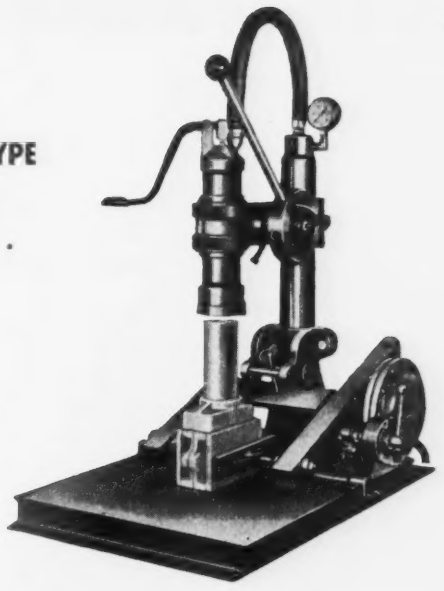
REDFORD CARTRIDGE TYPE BENCH CORE BLOWER . . . . .



The original small core blower . . Proven simplicity, speed and flexibility. Makes cores up to 2#.

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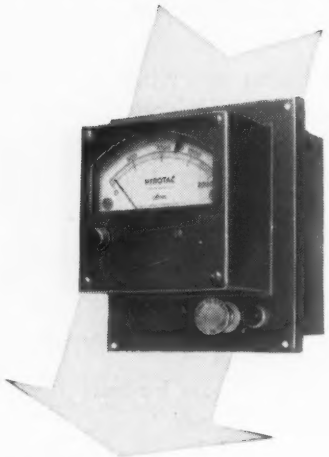

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NATIONAL METAL CONGRESS

Has Record Attendance

By EDWIN BREMER
Metallurgical Editor
FOUNDRY

FIRST World Metallurgical Conference, held in conjunction with the 33rd National Metal Congress and Exhibition, was one of the most successful ever arranged by the American Society of Metals and its cooperating organizations—the American Welding Society, Institute of Metals Division, American Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing.

Held at the Michigan State Fairgrounds, Detroit, Oct. 13-19, over 400 firms displayed equipment valued at between $9 and $10 million, and over 40,000 visitors attended. Participating in the sessions were more than 400 representatives from 36 foreign countries.

At the annual business meeting these officers were elected: President, Dr. John Chipman, Massachusetts Institute of Technology, Cambridge, Mass.; vice president, R. L. Wilson, Timken Roller Bearing Co., Canton, O.; treasurer, R. L. Dowdell, University of Minnesota, Minneapolis; trustees, G. A. Roberts, Vanadium-Alloys Steel Co., Latrobe, Pa., and J. B. Johnson, Wright-Patterson Air Force Base, Dayton, O. Following the meeting Dr. Clarence H. Lorig, Battelle Memorial Institute, Columbus, O., presented the 1951 Campbell Memorial Lecture on "A Metallurgist Looks at Fracture." At the annual banquet Paul D. Merica, International Nickel Co., New York, was recipient of ASM's gold medal; Robert F. Mehl, Carnegie Institute of Technology, Pittsburgh, received the Sauveur Achievement award, and G. A. Price, Westinghouse Electric Corp., Pittsburgh, received the Advancement of Research medal.

Exhibitors at the Metal Exposition included 17 foundries displaying a wide variety of castings in steel, gray and nodular iron, brass and bronze, aluminum, and magnesium. About one-half of the exhibits showed castings made with investment molding. Foundries with exhibits were: Alloy Engineering & Casting Co., Champaign, Ill.; American Brake Shoe Co., New York, with its various divisions; Austenal Laboratories Inc., New York; Casting Engineers Inc., Chicago; Dow Chemical Co., Midland, Mich.; Frontier Bronze Corp., Niagara Falls, N. Y.; General Alloys Co., Boston, Mass.; Hitchener Mfg. Co., Manchester, N. H.; Howard Foundry Co., Chicago; Janney Cylinder Co., Philadelphia; Lynchburg Foundry Co., Lynchburg, Va.; Michiana Products Corp., Michigan City, Ind.; Michigan Steel Castings Co., Detroit; Midwest Foundry Co., Coldwater, Mich.; Precision Metalsmiths Inc., Cleveland; Standard Alloy Co., Cleveland, and Universal Castings Corp., Chicago.

During the various technical sessions three papers of interest to foundrymen were presented. One on "Interrelation of Mechanical Properties, Casting Size, and Microstructure of Ductile Cast Iron" was prepared by R. W. Kraft and R. A. Flinn, American Brake Shoe Co., Mahwah, N. J. According to the authors, the austenitic specimens of ductile cast iron provide the best as-cast ductility (10 to 24 per cent) while the bainitic and martensitic materials exhibit highest tensile strength.

New Test Blocks

Ferritic type produced by heat treatment displays elongation similar to the austenitic bars but with higher yield and tensile strength. Pearlitic irons show higher strength but lower elongation than the ferritic. Data indicate that ductile iron is section-sensitive in certain cases and exhibits greater shrinkage than normal cast iron. It was necessary to develop a new series of test blocks to provide sound test bars representative of the general range of commercial casting from ¼ to 5 in. thick.

With proper combination of metal processing, analysis and heat treatment to avoid massive carbide or flake graphite, excellent correlation with steels of similar matrix is obtained with about 20 per cent decrease in strength due to spheroidal graphite. Hardenability is comparable to steels of same analysis. Impact resistance of the austenitic type is similar to annealed SAE 1095 while the ferritic type is poorer in some cases. In contrast to normal cast iron of the same matrix, tensile strength is two to three times higher and elongation five to twenty-five times greater. Castability as determined by the fluidity spiral is as good as normal cast iron.

A statistical study of six months commercial production using a basic-lined cupola indicates that only 9 per cent of the heats of the ferritic type were rejected under the specification

(*Concluded on page* 262)

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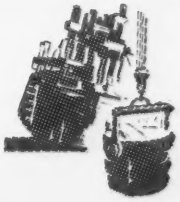
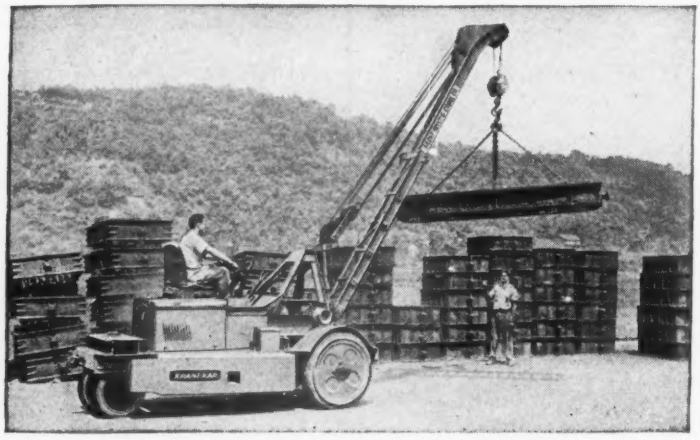


8¢ per TON IS HANDLING COST REPORTED BY A FOUNDRY USER OF *KRANE KAR*



A Midwestern foundry reports, "***KRANE KAR*** can unload 50 to 55 tons of pig iron and malleable steel in 3 hours." Steps up unloading from gondola cars into storage piles and bins, and loading of scale cars and charging buckets. Magnet also handles skullcrackers. ***KRANE KAR*** may be operated by any man. Ask our nearest agent how to prune your materials-handling cost for modern, economical foundry operation. Ask for our New Bulletin No. 79.

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METALLOY CORP., Division
Rand Tower
Minneapolis 2, Minnesota

(*Concluded from page* 260)

60,000 psi tensile strength, 45,000 psi yield strength and 10 per cent elongation minimum. In all cases cause for rejection was from the structure and remedied by a change in processing.

L. F. Porter and P. C. Rosenthal, University of Wisconsin, Madison, Wis., presented a paper on "Gas Evolution from Gray Cast Iron During Enameling," and established through systematic control of the variables associated with dry-process enameling that the major cause of gassing during the firing cycle is the evolution of carbon oxide gases from the surface of the iron. These gases come from a reaction between carbon from the iron and oxygen supplied by the atmosphere and evolve soon after the enamel is molten, with evolution increasing in intensity and then finally ceasing after a time dependent on furnace temperature.

Observes Gas Evolution

Hydrogen absorbed during melting does not cause gassing when gray cast iron is enameled but hydrogen absorbed from extensive rusting or electrolytic treatment of gray iron prior to enameling can cause defects. Chilled or white iron, on the other hand, readily reveals defects from hydrogen absorbed during melting. A method devised to view the enameled specimens during the entire cycle made it possible to observe that the carbon oxide gas evolution occurred during the firing process, whereas hydrogen gas evolution occurs primarily while the plate is cooling. Carbon oxide defects usually are pinholes while those from hydrogen are generally blisters.

Characteristics of cast 21 Cr—9 Ni alloy steels intended for 1200 to 1600° F service were reported in detail by H. S. Avery, C. R. Wilkes and J. A. Fellows, all of American Brake Shoe Co., Mahwah, N. J. Data were given on room temperature mechanical properties in both the as-cast and after aging at 1400° F states, as well as creep and creep-rupture properties from 1200 to 1600° F. The authors also dicussed magnetic permeabiilty after various thermal treatments, behavior in hindered thermal contraction, resistance to oxidation at elevated temperature, hot hardness variation with temperature, influences of thermal history on structure, etc. Comparisons of the 21 Cr—9 Ni alloy with cast 26 Cr—12 Ni alloy show superior aged ductility with equivalent creep strength and satisfactory oxidation resistance for the former up to 1600° F.

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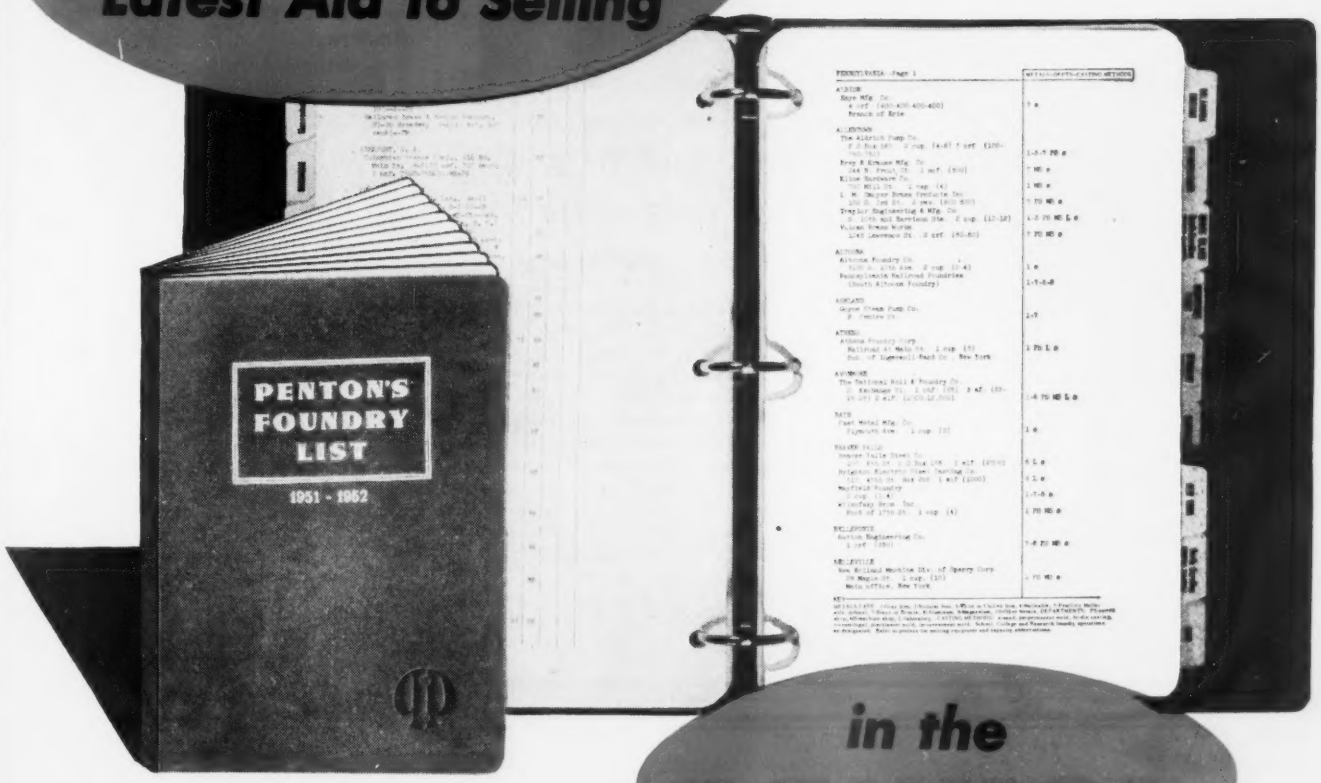

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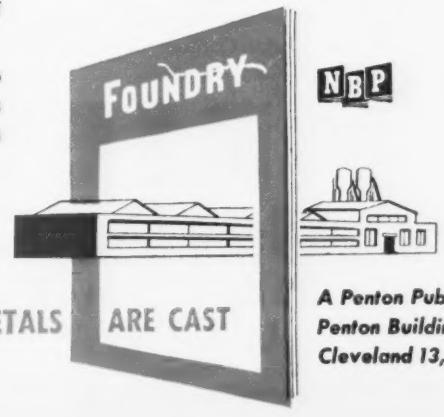

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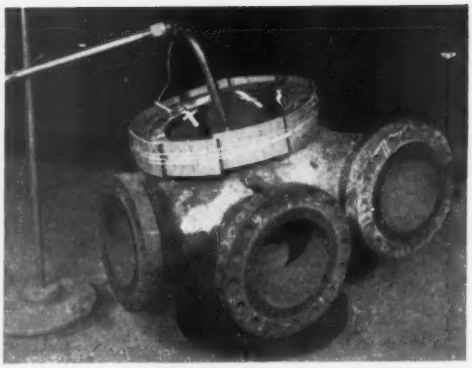
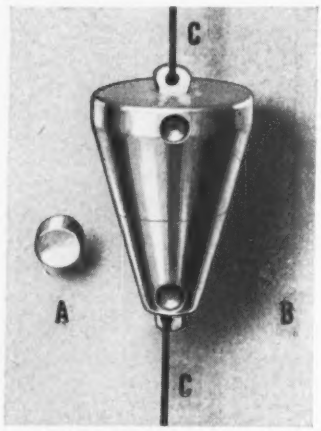


Radiographing a flange on a heavy steel casting.



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The Basic-Lined Cupola

(*Continued from page 95*)

viscosity is so high that they are not only difficult to keep flowing through the slag hole but very probably do not remove sulphur efficiently, despite the favorable appearing chemical analysis.

It is easiest and cheapest to cover the bottom of the cupola with heap sand, rammed in place and to a contour which will permit the cupola to drain easily, just as in acid practice. There is no noticeable erosion of the interface between the sand and the basic lining, and although some operators like to cover the sand with ½-in. of Gundol, this is unnecessary and even harmful in that it occasionally forms a dense, tough layer which prevents a clean drop when the day's run is over.

Operating Characteristics

Now that we have the cupola rebuilt for basic operation, we shall consider some of its operating characteristics. The first thing that an operator notices about the basic cupola is the change in the appearance of the slag. While he wants to know its chemical analysis, good chemical sampling of the slag from a cupola is most difficult. Many published results of these slag analyses show variations which were quite temporary in nature, or never really existed, because they resulted from the segregation of the slag constituents produced as the sample solidified. None of them could be related to any important operating characteristic of the cupolas concerned. Unless there is some well defined purpose in mind, it is not recommended that slags be analyzed. However, if slag analyses are made, the sample should be obtained as a thin sheet to minimize segregation effects.

Hold a clean piece of steel plate briefly under the slag stream. Carefully remove all the slag that sticks to it and crush and grind the slag. The sample should be large enough so that it may be quartered several times before chemical analysis. Even then, the analysis is only of a little bit of the slag which happened to be running out of the cupola at the instant the plate caught it. The idea of picking up a lump of slag from the floor and handing it to the chemist with the hope that something significant will result is a mistaken one.

The most promising method of chemical control is through watching the slag. Make a small cast iron mold that provides a cavity about 3 in. in diam and about 1 in. deep. Attach a long handle to this and fill it with

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slag directly from the cupola about every 15 minutes. If all is going well, the upper surface of the cooled slag pancake will appear dull brown in color, speckled with lighter brown dots. Its fracture will be granular and somewhat porous, especially in the upper half. This slag is highly basic and the iron oxide is low.

If the slag should turn black and its surface become shiny, the iron oxide has gone up and in a few minutes the metal will lose silicon, pick up sulphur, appear cool and its chill will increase. To prevent too much bad metal, double the coke volume on the next charge going in as soon as the slag appearance changes. In a few minutes it will return to normal and so will the metal. These black slags also show a granular fracture section, but generally they are not so porous as the brown ones.

Slags that look greenish black on both the top and bottom of the pancake and show a glassy fracture are acid slags. If an acid slag is obtained, it may be corrected by increasing the limestone addition, but it usually means the basic lining to the firebrick has been pierced and the cupola is no longer basic. This would occur only under unusual circumstances, such as when a large amount of sand clings to the remelt scrap or the basic lining fails.

Slag Appearance Varies

The slag appearances described were witnessed at several cupolas making nodular iron. Perhaps, under other conditions, the slags would look different, but the principle is of sufficient value to each operator to make it worthwhile for him to work out a process of his own.

A major peculiarity of basic slags is their lack of affinity for coke. This may be observed after the cupola bottom is dropped. The residual coke is clean and no slag sticks to it. Occasionally small pieces of coke are discharged out of the slag hole. These, too, are clean and since we know that basic steelmaking slags do not wet coke, it is reasonable to assume this phenomena is true of basic cupola slags as well. This peculiarity seems to have a bearing on most of the chemical reactions occurring in the cupola, and it is well to bear it in mind as we discuss these reactions. In particular, the uncoated pieces of coke, in intimate contact with the slag and metal, probably account for the low iron oxide content of the slags and the ease with which the metal will pick up carbon.

Sulphur, carbon, silicon ,phosphorus and manganese are the most important chemical elements to the cupola

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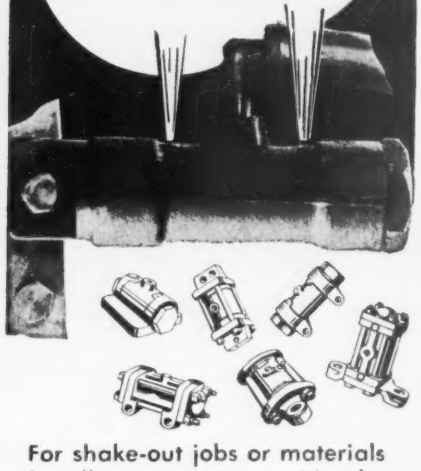

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operator. Sulphur removal is helped by higher temperatures, lower blast pressures, and larger slag volumes. To give rough figures, consider one basic cupola in operation at present. It is lined down to 48 in., uses 10 to 11 oz cold blast, and a 1200-lb metallic charge containing about 0.15 per cent S. Use of 120 lb of limestone provides 11 in. of slag on the metal. The sulphurs come out at about 0.03 per cent. If sulphurs that low are not needed, lower the slag hole and cut limestone additions. About 85 lb would give about 0.04 or 0.05 per cent S and about 7 in. of slag.

The mechanism of sulphur reduction is not too well understood. Under certain conditions sulphur in the metal will combine with the lime in the limestone to form some such compound as CaS. Some of this is oxidized by the blast to form SO_2, which escapes out the stack. However the

CaS, if that is what the compound actually is, will not form unless the slag is highly basic, i.e., that it contains a lot more lime than silica, and unless the iron oxide content of the slag is low.

The same factors that lower sulphur increase the metal's carbon content. It is sometimes easier to keep the blast, coke, and metallic charge constant and vary the carbon content with changes in the limestone additions. One cupola operator gave these figures. He uses 11 oz cold blast pressure, 17 per cent coke, and about 2.60 per cent carbon in his charge. With a 6 per cent limestone addition, he gets 3.40 per cent C; with 8 per cent limestone, 3.60 per cent C; and with a 10 per cent addition, 3.80 per cent C.

It has been observed from the appearance of the flame at the charging door that the gases contain less carbon when the limestone addition

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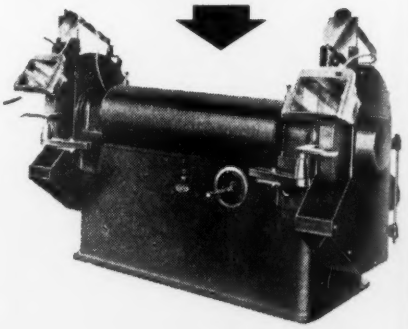

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is heavier and more carbon with less limestone. If less limestone is desirable and a high carbon content is needed, more coke may be added. Because there is greater erosion of the basic lining during the early stages of the cupola run, it is generally more efficient to cut the limestone additions about 20 per cent on the first several charges. Slag fluidity may be improved by adding fluorspar to the charge. The average addition would be about 8 lb fluorspar to each 100 lb limestone.

Silicon losses are high and amount to more than twice the loss experienced in comparable acid practice. To combat this, more silicon may be added to the charge or, better still, if the process permits, it should be added to the stream of metal entering the ladle or forehearth. Silicon is oxidized readily to SiO_2, which dissolves readily in the basic slag. This has the unfortunate result of increasing the slag volume while it decreases the slag's ability to remove sulphur. To offset the effects of large silicon losses, more limestone must be added or the slag will satisfy its lime requirements by attacking the basic lining. Silicon losses may be minimized by adding more coke to the charge and/or reducing the blast pressure. Before large silicon losses are evident in the metal, they may be anticipated by observing the appearance of the slag and making corrections before too much damage is done.

Phosphorus Removal Impractical

Phosphorus may be removed, but only after all of the silicon has been removed from the metal, so that at present any substantial phosphorus removal is impractical.

Manganese losses are low, amounting to a little over half of what may be expected from acid practice. Manganese is oxidized by the blast to manganous oxide. With the large amounts of silica present in acid slags, this manganous oxide dissolves in the slag, which apparently can hold large quantities of it, as a manganese silicate compound. Manganous oxide does not form compounds with the major constituents of a basic slag and its solubility is limited; consequently, only small amounts form and manganese losses are low.

Temperature of the metal depends upon the proper combination of blast and coke. Values mentioned previously (11 oz blast and 15 to 17 per cent coke) are presently producing good, hot metal at a number of foundries and probably are as good as any other combination to start with. However, since cupola operations are extremely

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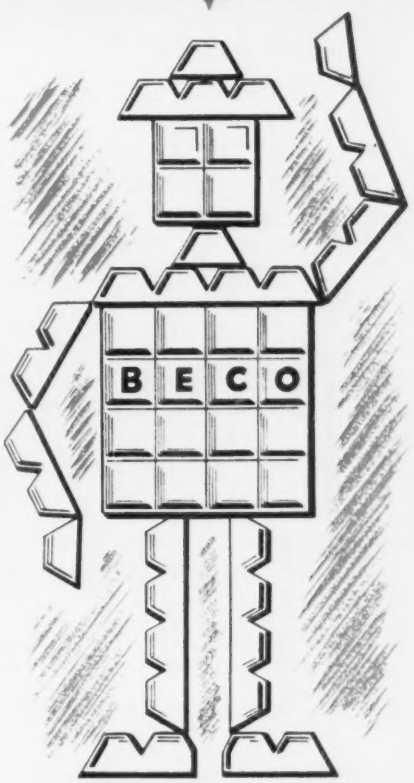

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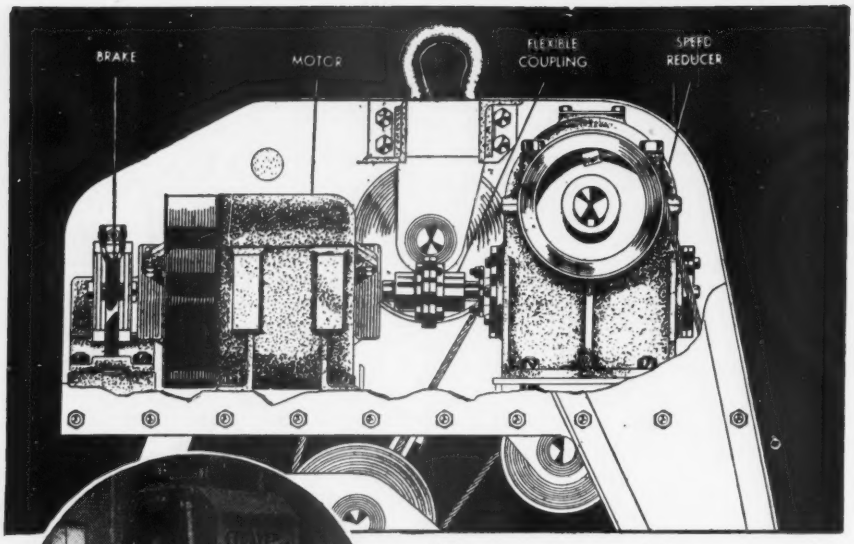

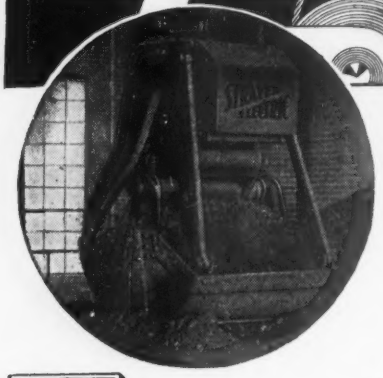

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variable, it is difficult to prescribe methods that will work everywhere.

Information in this paper was obtained on foundry floors and was compiled as a summary of the answers to the questions that operators ask most frequently. The contributors to this paper are too numerous to list here. I can only thank them again collectively and admire their perseverance and courage which made the basic cupola successful and their generosity which made this article possible.

Eye Conservation

(*Concluded from page* 101)

services of an opthalmologist or optometrist who should become familiar with plant conditions.

2. Facilities for emergency eye treatments, including eye fountains used to flush out foreign elements in workers' eyes.

3. Vision tests given to new and old employees to check for acuity (sharpness of vision for near and distance) as well as for other visual skills, muscle balance, color discrimination, depth perception, etc.

4. Utilization of information gained by tests in: (1) referring worker to eye specialists for corrective glasses (2) detection of eye diseases (3) selection and placement of workers.

5. Periodic rechecking of vision of all employees.

6. Analysis of jobs from the vision viewpoint.

7. Study of lighting conditions as they influence ability of workers to see properly and work safely.

8. Prevention of eye hazards by enclosing grinding wheels, mechanical handling of hazardous materials, segregation of welding operations, etc.

9. Compulsory wearing of eye protective equipment in all areas of foundry operations.

10. Application of rules to visitors, officials and others who happen in the the work area.

11. Providing prescription lenses for safety goggles where necessary.

12. Lens-cleaning kits made available to workers and facilities provided for repairing eye safety equipment.

13. Checking all accidents to determine if lighting, employee vision, inadequate safety measures, etc., were at fault.

14. Continuing safety education of workers by means of posters, safety campaigns, meetings, etc.

15. Organization of Wise Owl Club.

Miniature Engines

(*Continued from page 97*)

including triple-expansion marine engines, live-steam locomotives, farm type threshing engines, diesel and gasoline engines, centrifugal pumps and boiler fittings. All parts of the miniatures are made to exact scale of the full-size models they represent. Castings supplied in the kits are sold in the rough form just as they come from the molds except that the combination riser-sprue is sawed off.

The foundry is in the basement of Mr. Miller's home located on the shore of Lake Erie on a tiny bay which Mr. Miller calls Pirates Cove. Equipment includes a gas-fired furnace with a No. 12 bottom pour crucible, a ready-made metal molder's bench with electric vibrator, an electric sand riddle, and a core oven which is nothing more than a standard, portable sheet metal kitchen oven setting on two gas burners. Flask equipment consists of ten 10 x 10 in. flasks—eight are 3 in. deep and two are 12 in. deep; two 12 x 16 in. flasks, and two 6 x 8 in. flasks.

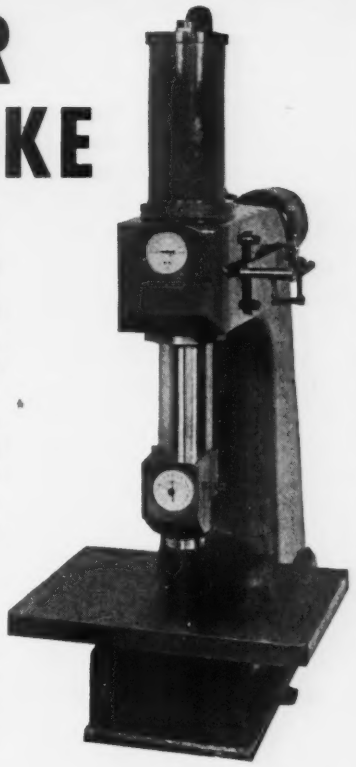
Do Some Specialized Job Work

Additional miscellaneous equipment includes the usual tongs, lifting rings, small molder's rammers, shovels and hand riddles. Cut-off and casting cleaning operations are performed on a wooden work bench with machinist's vise, hack saw and files.

The foundry is operated an average of four times weekly, major portion of the castings being model engine components for sale to hobbyists. However, a quantity of outside work is performed for organizations throughout the United States. This work generally is of a specialized nature involving complicated partings, small, intricate cores, or some other special molding application which makes the job objectionable to ordinary or "regular" foundries. One of these extra jobs which has become a more or less regular item is the 6 x 8 x 2 in. aluminum flask designed by Mr. Miller. It is in demand by jewelers.

Equipment for making this flask includes a one-piece mahogany pattern to form the outside and a one-piece corebox for making the dry sand core which forms the inside. The main reason for using a dry sand core is to facilitate formation of a sand strip around the inside of the flask. The core is a rectangular shell of 1¼-in. wall thickness. After it is placed in the mold the space in the center is filled with loose sand. As a matter of

A BETTER LONG STROKE BRINELL



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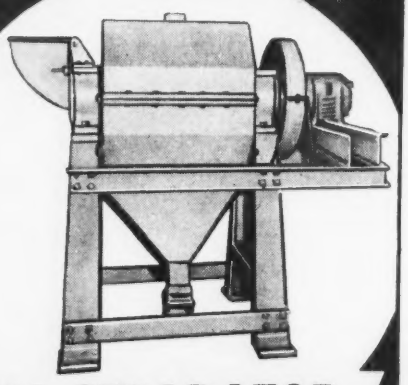

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fact, no metal ever flowed over the top of the core; the loose sand filling is a safety first gesture.

A cheek, or intermediate part, 1¼-in. deep is made from the same pattern and corebox. A loose wood strip ¾-in. wide is laid against each side and each end inside the corebox. The resulting space for the metal therefore is that much less. Molds for many of the parts for the various model engines produced are made from loose mahogany patterns. However, aluminum patterns mounted on aluminum plates are employed in making the molds for what might be described as standard type miniature engines. It is Mr. Miller's goal to get all of his patterns into the form of matchplates because of the easier and quicker molding and greater production they make possible.

Crucible Is Self-Skimmer

Melting capacity permits pouring about eight molds to a heat. The furnace takes a No. 12 crucible and consequently can melt about 12 lb of aluminum or 36 lb of brass, bronze or gray iron. A long-handle crucible type tongs is used to lift the crucible out of the furnace and place it in a hand ladle shank with the ring end resting on the floor and the other end resting against the wall. Molds are poured in the same manner as those in malleable and gray iron foundries. A small bridge spanning the crucible immediately back of the spout converts the crucible into a self-skimmer. From start to finish the operation of handling the crucible is a one-man job.

Most castings are poured in 85-5-5-5 bronze or scrap aluminum. While all kinds of aluminum scrap have been melted, preference is given to scrap automotive engine pistons. Some gray iron has been melted in the crucible, the charge consisting of alternate layers of metal and coke and a "pinch" of limestone. In most instances, however, when gray iron is specified the molds are taken to a neighboring gray iron foundry which obligingly fills the little molds with metal.

French sand is used for molds and cores. Majority of molds are green sand, but in some cases—for example, the miniature locomotive cylinder mold, Fig. 5—the mold is dried. Depending on the shape and size, and to some extent on the amount of artificial venting required, some cores are bonded with powdered rosin, and others are bonded with linseed oil. A typical core sand mixture contains 12 parts fine sand and one part resin, tempered with water. Addition of a small amount of cereal binder, cus-

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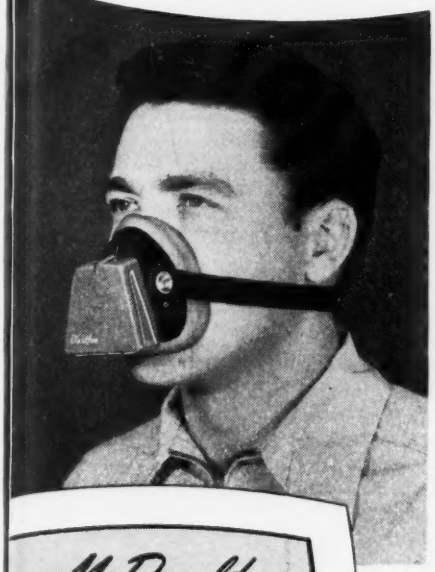

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tomary in ordinary foundry practice, is not necessary. Green strength is not a factor with these small cores. They do not sag out of shape.

Practically all of the pattern equipment and coreboxes used in the foundry are made by the owners. All drawings supplied with the kits and those for use in constructing patterns and other foundry equipment are prepared by Messrs. Miller or Vannerson. An upstairs room in the Miller home serves as a drafting room, pattern shop and office for handling the company's world-wide correspondence.

Many of the usual hazards, specifications and complications that plague the average foundry are not present in this particular little foundry. While in the majority of instances the molding procedure requires a true eye and high degree of manual dexterity, many other factors may be ignored. Gating presents no problem. The amount of metal is so small that it may be popped in through a riser at any convenient point. Casting yield approaches 100 per cent in relation to the amount of metal poured. From the practical point of view it is unnecessary to meet chemical or physical specifications. In the assembled form the castings never are exposed to severe operating conditions either in time or load.

Casting to close tolerances is considered unimportant. Hobbyists like lots of metal so they can machine away to their hearts content and have plenty of leeway for any slip they might make. High tensile or compression strength, resistance to shock, elongation or deflection are not considered factors of any importance by a man interested only in securing a set of castings he can finish and assemble with his own hands into a sweetly running, miniature facsimile of a full size engine.

Editor's Note: Since accumulation of facts for this article, Mr. Miller has been called back to duty with the armed services. Foundry operations at Pirates Cove have come to a standstill and all equipment has been stored. Mr. Miller plans to resume operations again when his tour of duty is ended.

Opens Show Room

Pangborn Corp., Hagerstown, Md., has opened a 58 x 61-ft demonstration room where various models of blast cleaning and dust control equipment are set up for operation so that potential users of the equipment can send or bring samples of work and have it processed by the machines. In this way they can determine which is the best piece of equipment for their needs. The room is under the supervision of Ralph R. Garver, company engineer of 36 years' experience.

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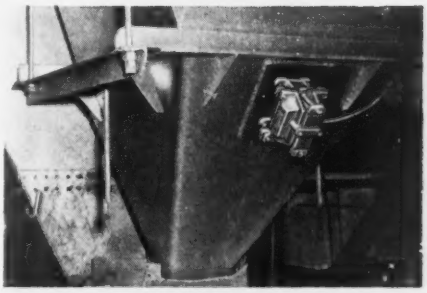
Material Handling Problems



BIN VIBRATORS
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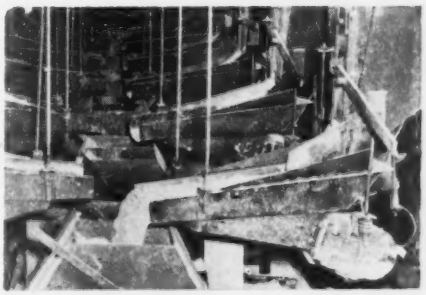

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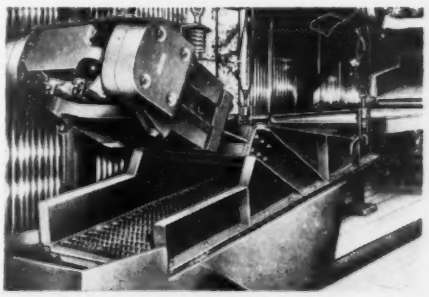

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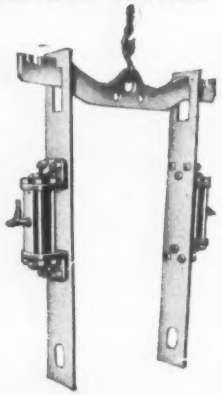

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For More Details on these Items Use Reply Card—Page 237

SILICA CEMENT: Harbison-Walker Refractories Co., Farmers' Bank Bldg., Pittsburgh 22—Folder describes a cement for laying silica refractories which corresponds in refractoriness and in chemical and physical properties to the best silica brick. Recommended for poured or trammeled joints, the bond does not soften in service, even at high temperatures. Bulletin illustrates comparative effects of heat treatment, refractoriness, trowelling and settling.
For More Details Circle No. 90—Page 237

METAL CLEANING: Oakite Products Inc., 157 Thames St., New York 6—Booklet, "Some Good Things to Know About Metal Cleaning," has sections devoted to electrocleaning steel and nonferrous metals; pickling, deoxidizing, bright dipping; prepaint treatment in machines and tanks; steam detergent cleaning; barrel cleaning; burnishing; treating water in paint spray booths, and rust prevention procedures.
For More Details Circle No. 91—Page 237

BATTERY CHARGER: Electric Products Co., 1725 Clarkstone Rd., Cleveland 12— Bulletin 11-220 shows exterior and interior views of a four-circuit motor generator battery charger for motorized hand-lift trucks. Glued to inside of left-hand door is information regarding sequence of operation, adjustments and maintenance. On front of charger is permanently fastened plate with complete operating instructions engraved on it.
For More Details Circle No. 92—Page 237

ENGINEERING IRONS: International Nickel Co., 67 Wall St., Dept. EZ, New York, 5—Reference bulletin contains 27 tables, charts, and photomicrographs to show how, through the use of nickel, alone or in combination with other alloying elements, the engineering properties of cast iron can be controlled to meet almost any reasonable combination of service requirements.
For More Details Circle No. 93—Page 237

METALLOGRAPH: F. T. Griswold Mfg. Co., 305 West Lancaster Ave., Wayne, Pa.—Bulletin describes a metallograph for examining, studying and photographing metal samples and other materials. Shown are typical photomicrographs made by the instrument of hypereutectoid steel samples at magnifications of X400, X1200, X2000 and X3400.
For More Details Circle No. 94—Page 237

TRUCK CARE: Baker Industrial Truck Division, Baker-Raulang Co., 1250 West 80th St., Cleveland 2—Bulletin 2100, "Care and maintenance of Industrial Trucks," contains 51 illustrations of steps to be taken in preventive maintenance and annual check-ups. Bulletin 1326-a describes benefits of company's line of fork trucks, available in capacities of 3000, 4000 and 6000 lb. Booklet contains dimension drawings which show maneuverability of trucks, detailed specifications and action pictures of specific operations.
For More Details Circle No. 95—Page 237

GLASS BLOCK: American Structural Products Co., Toledo 1. O.—Booklet discusses use of glass block as a replacement for worn-out window sash. Dimension tables and technical data on the correct method of installing glass block in various types of walls in industrial plants are included.
For More Details Circle No. 96—Page 237

CONVEYORS: Lake Shore Engineering Co., Iron Mountain, Mich.—Bulletin 512 describes flight and belt type portable conveyors and under car unloaders for handling bulk materials. Specification data are given on electric and gasoline powered models and on hand-move and self propelled conveyors.
For More Details Circle No. 97—Page 237

LUBRICATION CHART: Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.—Form 1102, a pocket-size lubrication chart for eight company industrial trucks, numbers truck service points, tells when they should be serviced, and recommends certain types of oils and greases.
For More Details Circle No. 98—Page 237

HEAT TREATING: Mahr Mfg. Co., Division of Diamond Iron Works Inc., Eighteenth Ave. No. & Second St., Minneapolis 11—Bulletin NX-1 describes and illustrates heaters, torches, forges, tool furnaces, blowers, valves, and other heat treating equipment.
For More Details Circle No. 99—Page 237

FLOORING: United Laboratories Inc., 16801 Euclid Ave., Cleveland 12—Booklet contains information on how and where to apply the company's resilient flooring material as well as certain technical data about the product. Typical flooring applications are illustrated.
For More Details Circle No. 100—Page 237

TRUCK OPERATION: Clark Equipment Co. Industrial Truck Division, 258 Champion St., Battle Creek, Mich.—Booklet, "Safety Saves," amply illustrated with cartoons, sets forth some commonsense rules for safe operation of industrial trucks.
For More Details Circle No. 101—Page 237

TUMBLING ABRASIVE: Norton Co., Worcester 6, Mass.—Booklet entitled "Barrel-Finishing with Alundum Tumbling Abrasive," describes a method of deburring and surface

finishing metal parts by abrasive tumbling. Abrasive is a manufactured aluminum oxide material, specially processed to impart a strong, blocky shape to individual grains. Detailed instructions are given for the barrel-finishing operation.
For More Details Circle No. 102—Page 237

FLASKS: Industrial Fabricating Inc., 817 Hall St., Eaton Rapids, Mich.—Bulletin 5-48 contains an information guide for selecting industrial flasks, flask pins, stub pins and bushings, steel jackets, bottom boards, core plates, and steel bands. Construction details and diagrams are furnished.
For More Details Circle No. 103—Page 237

ELECTRICITY: Cleveland Electric Illuminating Co., 75 Public Square, Cleveland 1—Booklet discusses modern electrical tools used by manufacturers to multiply manpower, by electric power, step up production, and increase profits.
For More Details Circle No. 104—Page 237

OIL COOLER: Trane Co., La Crosse, Wis.—Bulletin D-350-2 on evaporative cooling of quench oils contains suggestions for control of quench oil cooling systems, and selection, capacity and dimension data.
For More Details Circle No. 105—Page 237

LIFT TRUCKS: Barrett-Cravens Co., 4609 South Western Blvd., Chicago 9—Bulletin 5141 illustrates and describes hand lift trucks in capacities of 1000 to 15,000 lb with design drawings and specifications.
For More Details Circle No. 106—Page 237

CAR PULLERS: American Hoist & Derrick Co., St. Paul 1—Catalog 100-H-66 describes capstan drum, and continuous rope type electric car pullers. Specifications are included and applications suggested.
For More Details Circle No. 107—Page 237

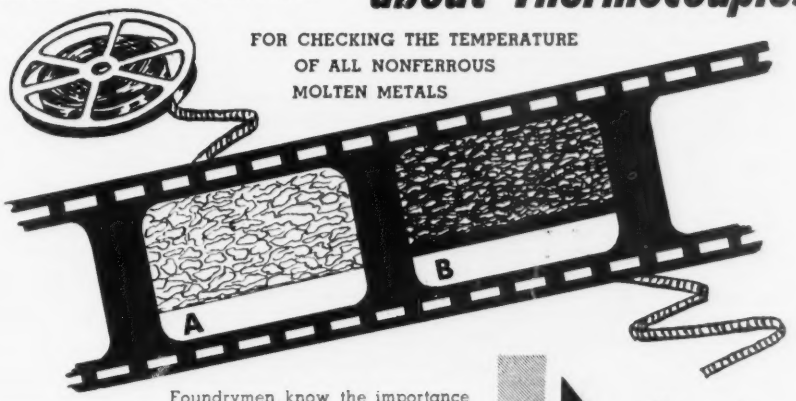
FLOORING: Walter Maguire Co., 60 East 42nd St., New York 17—Bulletin 651 describes a flooring material composed of emery aggregate and cement. Typical installations are illustrated.
For More Details Circle No. 108—Page 237

REFRACTORIES: Illinois Clay Products Co., Joliet, Ill.—Refractories folder gives information on fire clay brick and flour, ground and screened fire clay, and silica mix for cupola patching.
For More Details Circle No. 109—Page 237

CASTING CLEANING: Pangborn Corp., Hagerstown, Md.—Bulletin 1110 describes hydro-sand blast equipment and installation for cleaning castings.
For More Details Circle No. 110—Page 237

X-RAY EQUIPMENT: Picker X-ray Corp., 25 South Broadway, White Plains N. Y.—Catalog illustrates and lists industrial x-ray accessory equipment.
For More Details Circle No. 111—Page 237

FOUNDRYMEN-Get the "Reel" Picture about Thermocouples



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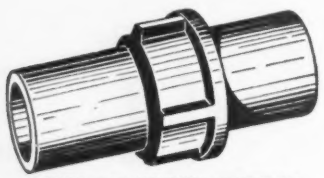

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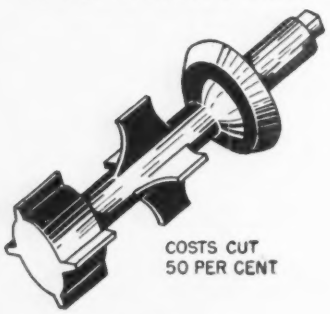

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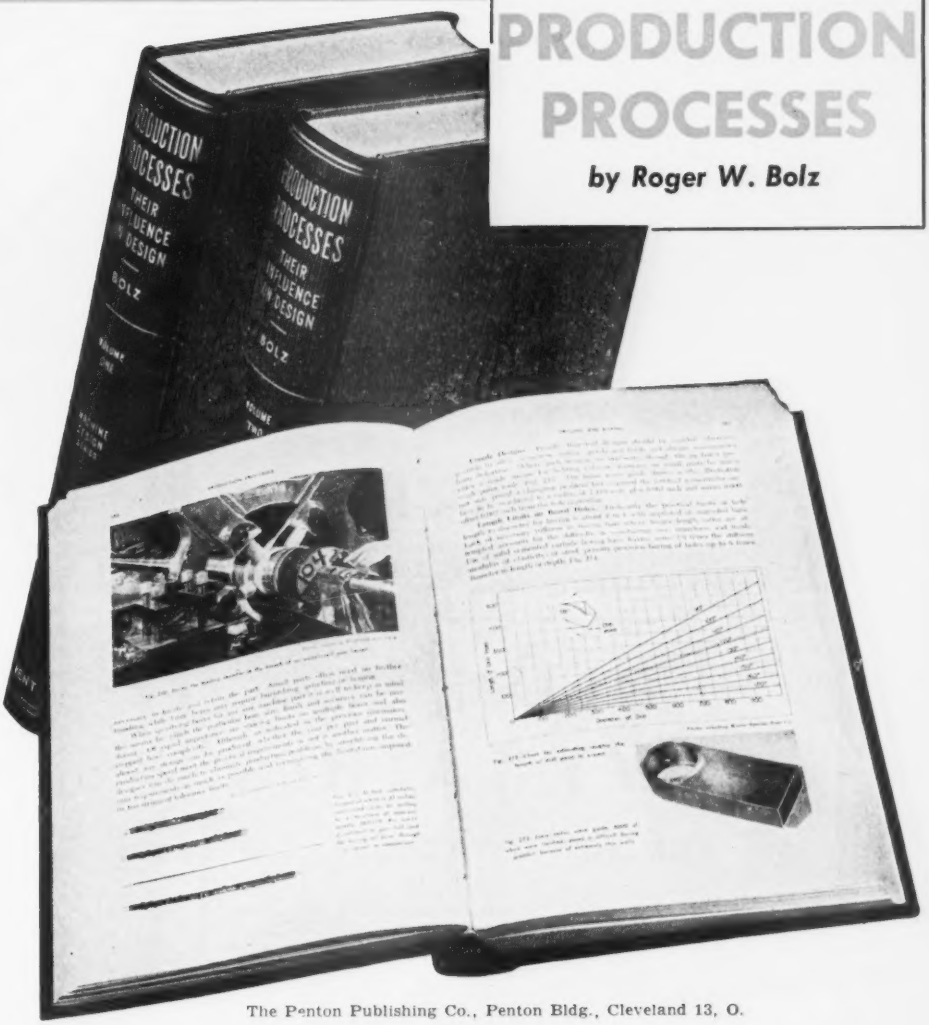

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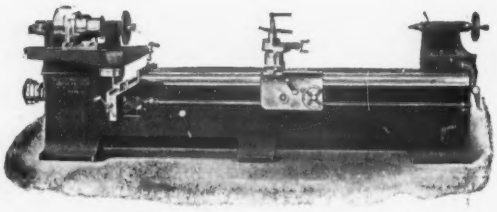

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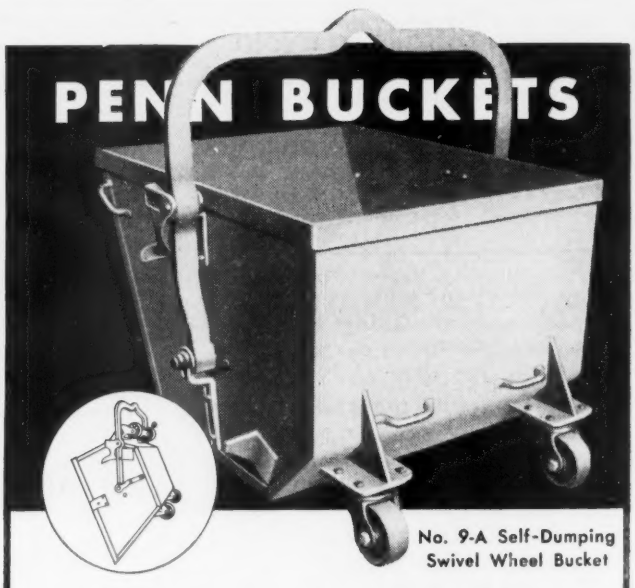

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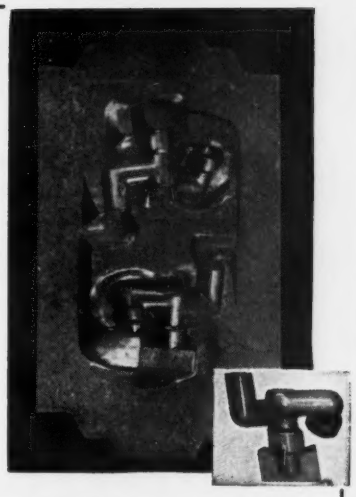

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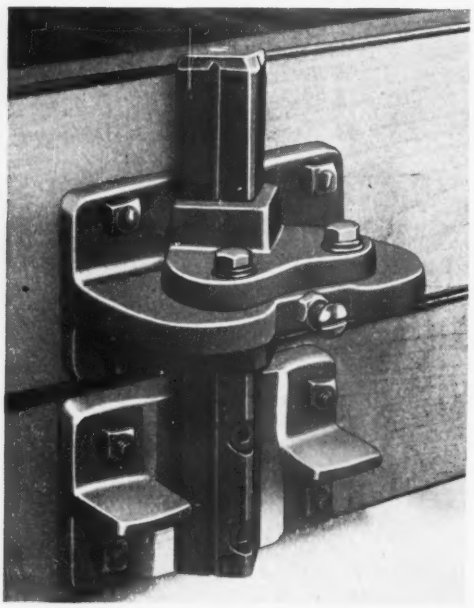

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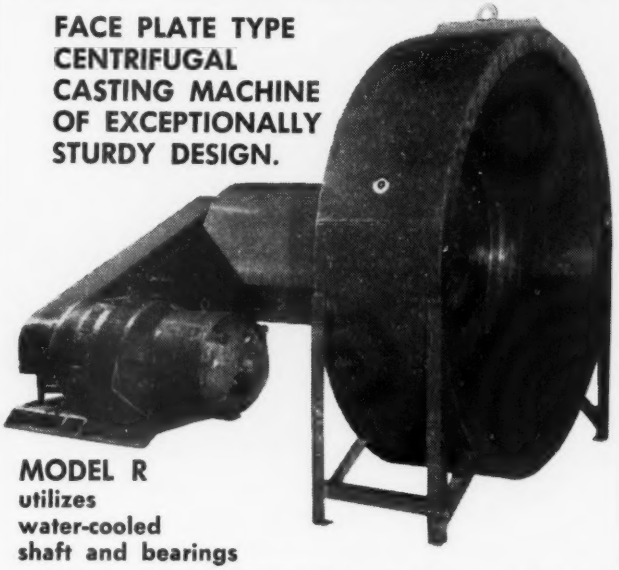

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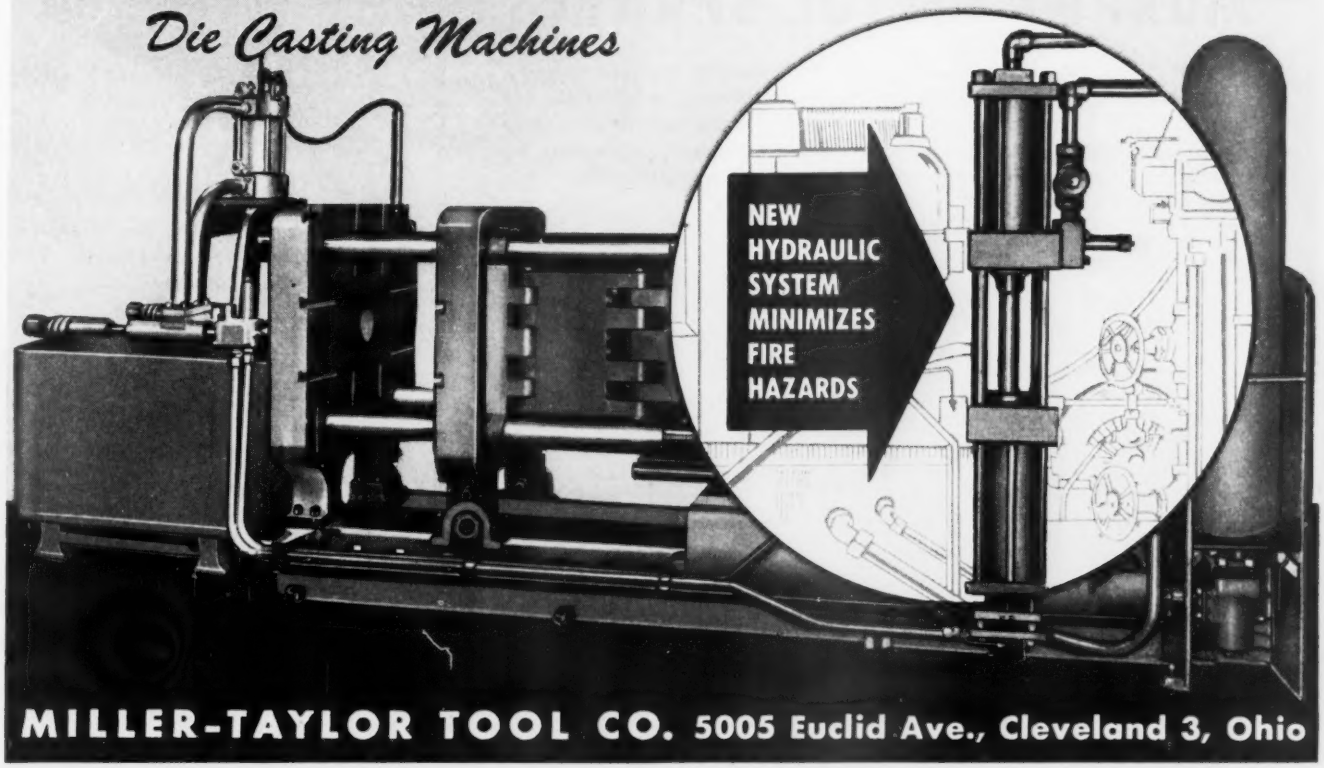

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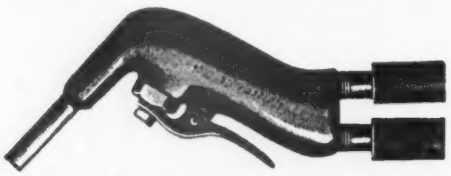

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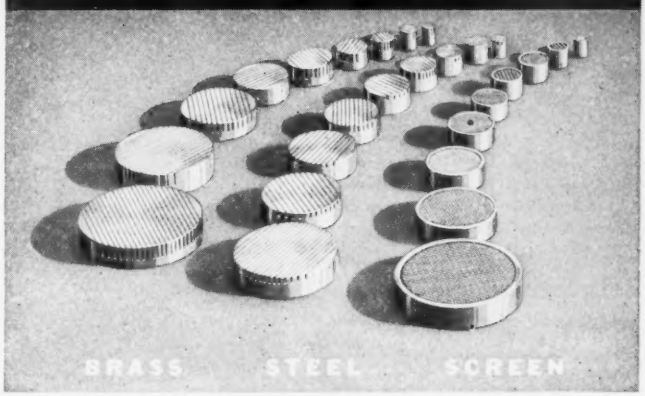

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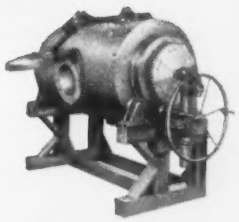

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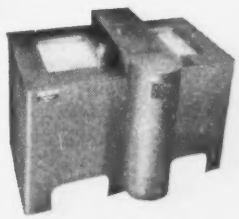

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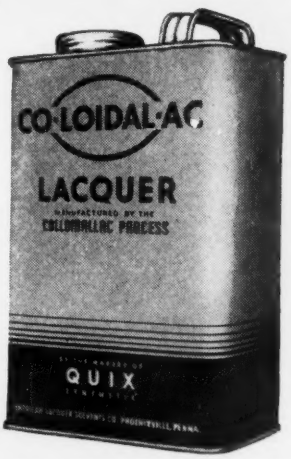

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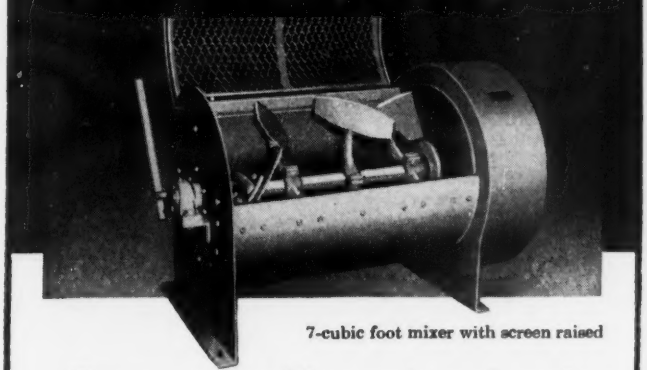

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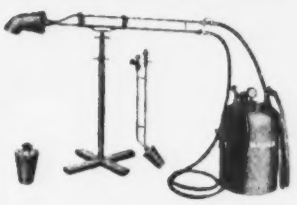

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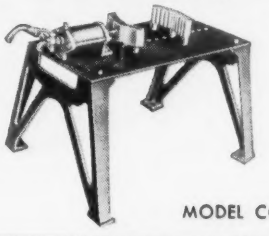

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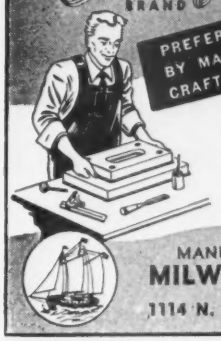

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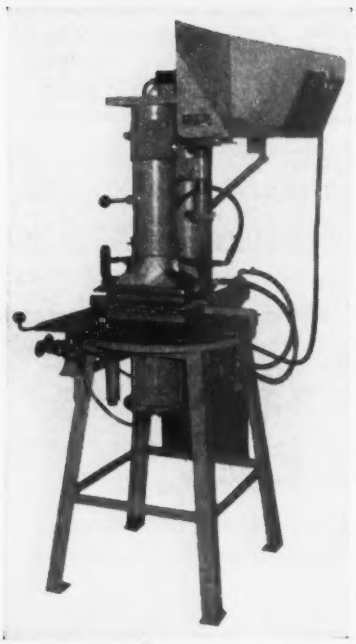

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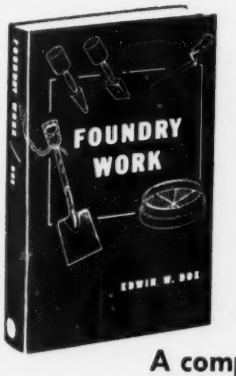

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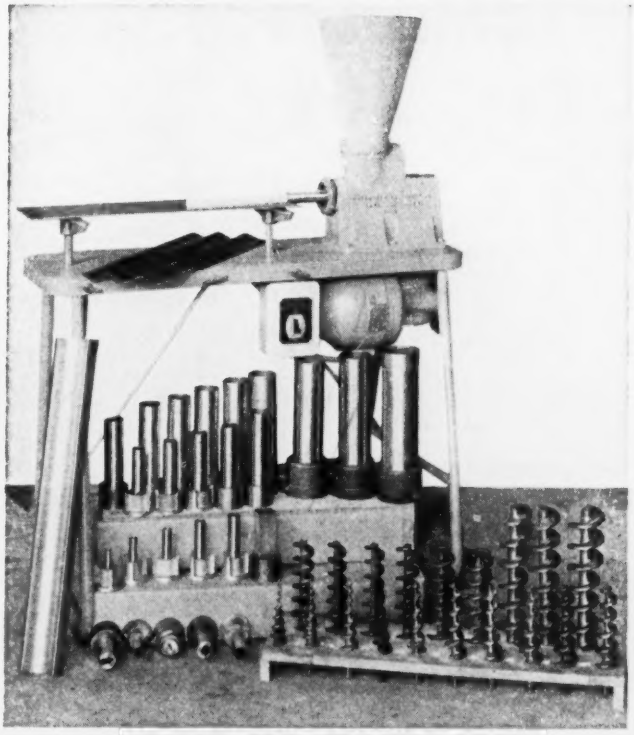

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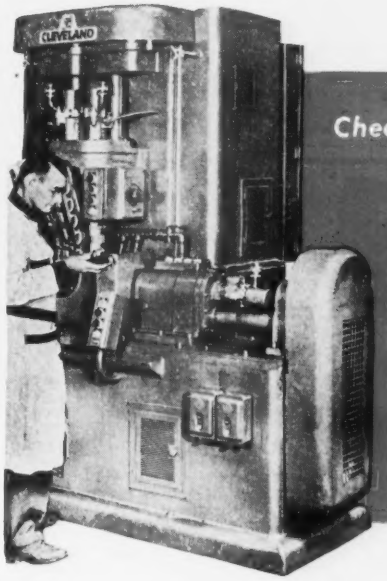

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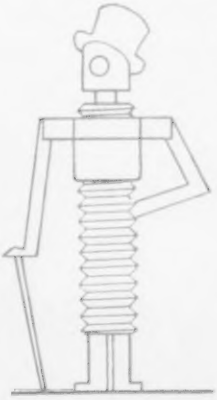

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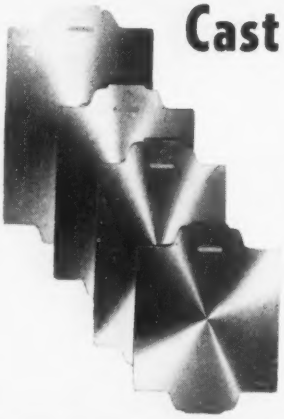

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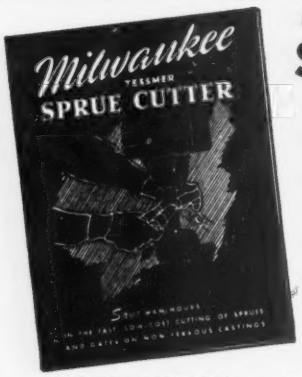

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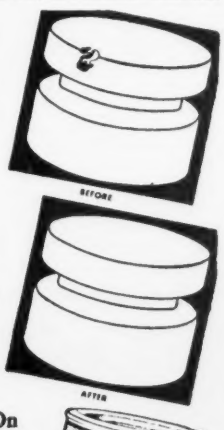

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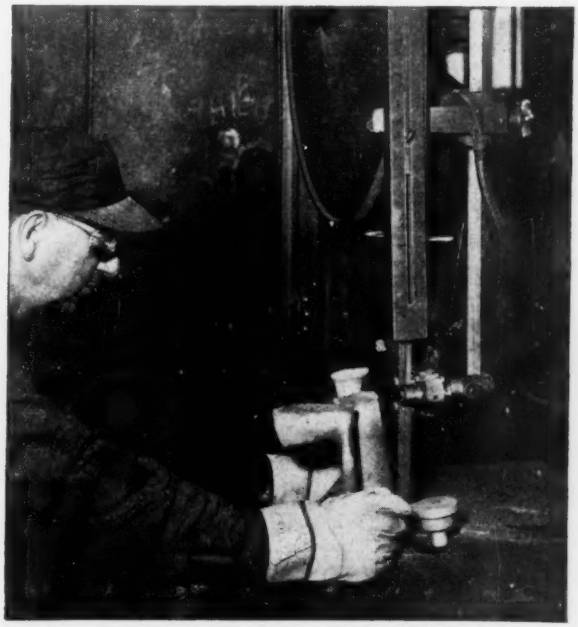

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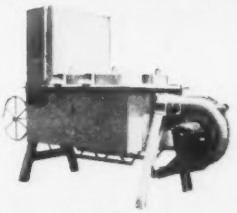
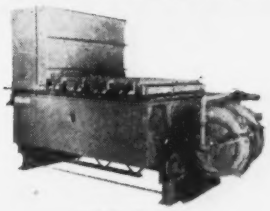


400 Series



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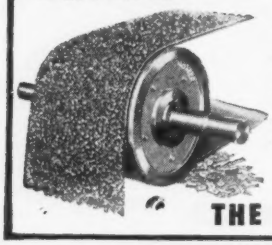

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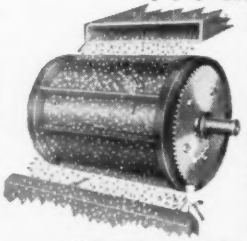

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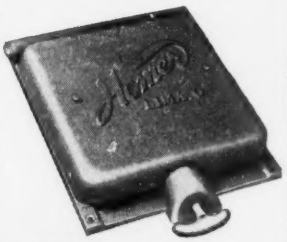

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HERE'S the low cost answer to the problem of handling coke and sand . . . the *same* dual-purpose Blaw-Knox "Shark Tooth" Single-Line Hook-On Bucket handles both, with minimum degradation of coke and without sand leakage, simply by adding or removing liner plates. Write for Form 2265.

BLAW-KNOX CLAMSHELL BUCKET EXPERIENCE CAN HELP YOU

The Blaw-Knox engineering service, backed by many years of experience in designing clamshell buckets for foundry applications, is at your service to help you select the bucket best suited to your needs.

BLAW-KNOX DIVISION of Blaw-Knox Company
2097 Farmers Bank Bldg., Pittsburgh 22, Pa.

BLAW-KNOX FOUNDRY BUCKETS

ANALYSIS OF CASTING DEFECTS

133 pages, illustrated
Price $4.25 Postpaid

To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.

THE PENTON PUBLISHING COMPANY
Book Department
1213 W. 3rd St., Cleveland 13, Ohio

TM Alloy Steel CHAINS

DO MORE WORK, LAST LONGER, COST LESS than wrought iron types!

Your chain problems are substantially reduced with TM Alloy Steel Chain. Records prove it *outlasts* and *outperforms* wrought iron types. It's more economical too!

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This Registration Ring bears the serial number and safe working load.

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A GREAT NAME IN Chain SINCE 1873

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Rush literature and prices on TM Alloy Steel Chains.
Name _____
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CLASSIFIED ADVERTISING

Help Wanted

STEEL FOUNDRY MEN

Opportunities for the following men in a large steel foundry:
Experienced Unit
Foremen for
- Melted Metals Dept.
- Foundry
- Core Room
- C.F. & A.
- Inspection
- Pattern

Also openings for engineers and draftsmen. Government owned defense plant in Chicago area to be operated on armor steel castings. Company operating set-up sufficiently large and aggressive to afford permanent opportunity to men whose performance proves to be outstanding.

BOX 685
FOUNDRY CLEVELAND 13, OHIO

CLEANING ROOM SUPERINTENDENT

Experienced man to supervise operation of cleaning department for Eastern Pennsylvania steel foundry producing 500 tons of miscellaneous carbon and low alloy castings a month. Position available immediately. Excellent opportunity for qualified man. Good salary, insurance and bonus. State age, experience and salary requirements. All replies held confidential. Address: Box 669, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For shop producing 500 tons carbon and alloy steel, 300 tons electric iron and 150 tons brass pressure vessel castings per month. Must have broad and extensive experience in foundry operations, proven administrative ability, and good practical and technical background. Excellent opportunity with long established company of best reputation.

Reply in confidence giving full information as to age, background and experience as well as salary requirements. Address: Box 470, FOUNDRY, Cleveland 13, Ohio.

WANTED

Long established foundry in Northwest has supervisory openings for:
1—Shipping Department
2—Machine Molding (must be familiar with production)
3—Pouring and shakeout

Applicants must have had previous experience. Opportunities excellent. Answer giving age, education, family status, expected starting salary, references and other pertinent information in first letter.

BOX 678
FOUNDRY CLEVELAND 13, OHIO

POSITION OPEN—MIDWEST

Ferrous Metallurgist or foundry engineer—Man between 25-30—needed in expanding research organization. College degree in Metallurgy or equivalent necessary. Experience not important. Write stating age, education and salary expected.

BOX 655
FOUNDRY CLEVELAND 13, OHIO

CLEANING ROOM FOREMAN

Experienced foreman for miscellaneous and semi-production steel foundry. Must have thorough knowledge of heat treating. Excellent opportunity for right person. Good salary, insurance and bonus. State qualifications and expected salary. Location—Detroit area. Address:

BOX 611
FOUNDRY CLEVELAND 13, OHIO

FERROUS METALLURGIST

For high frequency melting. Ground floor opportunity in new division of established company in Western Michigan. Address: Box 645, FOUNDRY, Cleveland 13, Ohio.

CASTING SALESMAN

Experienced industrial salesman for ferrous and nonferrous castings in the Detroit area. Not over 40 years of age. Excellent opportunity to present large producer. Give detailed information as to background, sales experience, and salary expected. Reply confidential. Address: Box 694, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

DIE CAST DIE DESIGNER OR PERMANENT MOLD DESIGNER

Light metals experience required. This is a permanent job with unlimited future for qualified man. Position is in modern midwest foundry facility now undergoing expansion. Salary commensurate with ability. Bonus plan. Send complete resume. Address: Box 499, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

For large aluminum sand foundry in the Middlewest. Must be experienced in foundry operations. Address: Box 581, FOUNDRY, Cleveland 13, Ohio.

SALESMAN

To call on foundries and allied industries, foundry sands, graphite and miscellaneous materials for Western Pennsylvania, Eastern Ohio and West Virginia. Address: Box 702, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Experienced in malleable pipe fittings is wanted for a foundry in Israel. Reply in confidence giving full details of experience etc. to: INTERNATIONAL FERMONT MACHINERY CO., INC., 115 BROADWAY, NEW YORK 6, N. Y.

METALLURGIST

For malleable casting foundry in Pennsylvania employing 225 men. To be in charge of air furnace batch type melting, sand control and other details assisting plant superintendent. Malleable iron experience desired but not mandatory. Write personal data, salary desired and resume of experience to: Box 684, FOUNDRY, Cleveland 13, Ohio.

TIME STUDY MAN

Young, some foundry experience, will train suitable applicant, must be free to travel. State qualifications, age and salary. Address: Box 680, FOUNDRY, Cleveland 13, Ohio.

INDUSTRIAL ENGINEER

Young, some foundry experience, must be free to travel, college graduate preferred. State qualifications, age and salary. Address: Box 679, FOUNDRY, Cleveland 13, Ohio.

ENGINEERS—DRAFTSMEN

Experienced in foundry layout, equipment details and specifications. Prefer experience in foundry plant engineering or materials handling equipment. Write giving outline of experience and salary required.

LESTER B. KNIGHT & ASSOCIATES, INC.
600 WEST JACKSON BLVD. CHICAGO 6, ILL.

SUPERINTENDENT

Experienced in production and jobbing work in aluminum and brass foundry. Wanted for Northern Ohio. State full details in first letter. Address: Box 708, FOUNDRY, Cleveland 13, Ohio.

Representative Wanted

REPRESENTATIVES WANTED

Sales representatives wanted on commission basis for New York City and one for the State of Michigan, by an old established, good equipped gray iron and semi-steel foundry with open capacity to make castings up to 20,000 lbs. each. Address: Box 682, FOUNDRY, Cleveland 13, Ohio.

REPRESENTATIVES WANTED

Well established manufacturer of core oils, refractory cements and foundry facings wants experienced salesman or manufacturers agent in Chicago and surrounding territory. Excellent opportunity for good earnings. State full experience, age, etc. in reply. Address: Box 689, FOUNDRY, Cleveland 13, Ohio.

Representative Wanted

REPRESENTATIVE WANTED

By old established foundry sand company—must be experienced foundryman. We produce a complete line of foundry sands and other material used in the foundry. Address: Box 681, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY REPRESENTATIVE

Prominent Eastern Aluminum and Bronze foundry, producing high quality castings of sand and permanent mold is in a position to accept additional work from only well-rated firms. Address: Box 691, FOUNDRY, Cleveland 13, Ohio.

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New concern, manufacturing resinoid bonded grinding wheels has available exclusive territory for reliable agents now serving industrial plants.

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MANAGER—ASSISTANT TO PRESIDENT

Steel, iron, brass. Thoroughly experienced in every shop operation, metallurgy, engineering, accounting and management. Excellent ability to develop a superior organization by leading, teaching and example. Outstanding reputation for keen analysis, sound judgment and a rare combination of practical experience, managerial ability and effective personality. Address: Box 375, FOUNDRY, Cleveland 13, Ohio.

PRACTICAL GRAY IRON MAN

Desires position as superintendent or assistant superintendent. Good past experience and technical training in all foundry phases. Young and hard worker, employed. Address: Box 670, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Dependable and experienced metallurgist and electric melter—acid and basic practice, laboratory, melting, heat treat and sand control. Capable of increasing quality control and elimination of trouble causes with use of technical and practical experience and overall foundry knowledge. Looking for responsible position with reliable electric steel foundry. Address: Box 704, FOUNDRY, Cleveland 13, Ohio.

ASSISTANT NONFERROUS FOUNDRY SUPERINTENDENT

Metallurgical engineer, 35, with twelve years' practical and technical foundry experience of which six were in supervisory capacity in laboratory and foundry. Well versed in all phases of production and jobbing in magnesium, aluminum and bronze. Will relocate anywhere. Address: Box 703, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN

Cleaning—heat treating—inspection. Age 38—15 years' practical and supervisory experience in production of carbon, alloy, stainless and cast armor. We would like to locate in West or Southwest. Address: 706, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

And practical foundryman with 26 years' of operative and consulting experience in grey iron, malleable iron and brass foundries, production and jobbing work; cupola, air furnace and electric furnace operating, gating, heat-treating, progressive sand control for mold and core application, cost conscious, seeks employment with progressive foundry. Address: Box 677, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY MANAGER

Outstanding record of achievement in all phases of gray iron operation. Willing to locate anywhere there is a challenge to my ability to organize and run a low cost operation. Good labor record. Age 40. Will make substantial five figure salary requirement a profitable expenditure.

BOX 690
FOUNDRY CLEVELAND 13, OHIO

PRESSURE CASTINGS

Experience on match plates, core box and drier work with precision castings made in plaster. Can set up and operate shop. Also experienced patternmaker on wood and metal work. Have in Detroit storage shop equipment for casting and pattern work. What savings you could make on patterns made in your own shop! Address: Box 700, FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

Wood metal and drier. Forty years' experience. Working foreman or can take charge of large shop. Address: Box 699, FOUNDRY, Cleveland 13, Ohio.

BRONZE MOLDER

Ornamental bronze molder desires position in Chicago district only. Can take full charge of foundry. Not interested in any other part of the country. Address: BOX 580, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN

Twenty-two years' experience in all phases of steel foundry. Facing sands for clean castings, gating and heading for solid castings and for lowest cleaning cost. Best of references. Address: Box 693, FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY SUPERVISOR

With 35 years' practical experience from molder to superintendent is open for an offer. Experience covers many lines from light to heavy castings. Production and jobbing—prefer medium or small shop, East or Mid West. Best of references on character and ability. Address: MR. T. E. LaMONDY, 112 GLENDALE AVE., ELKHART, INDIANA.

FOUNDRY SUPERINTENDENT

Twenty-two years' experience in the foundry. Fourteen years as a supervisor. Light production to heavy jobbing work. Some nonferrous jobbing up to 300 pounds. Practical experience in every department. Cost minded and progressive. Now employed. Address: Box 701, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Twenty-five years' experience in all foundry operations, light to medium grey iron or sand cast aluminum. Eight years' supervisory experience. Available immediately. Age 45. References. Address: Box 696, FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP SUPERINTENDENT

In some large foundry producing grey iron or malleable iron castings in large quantities. Location not a prime factor. Twenty years' experience. Address: Box 676, FOUNDRY, Cleveland 13, Ohio.

JR. METALLURGIST

M.S. Metallurgical Engineer. One year's experience in developing shell mold process for manufacturing company. Limited ferrous and nonferrous foundry experience. Interested in all phases of foundry work. Address: Box 697, FOUNDRY, Cleveland 13, Ohio.

GENERAL FOREMAN OR FOREMAN

Large or small castings in gray iron or nonferrous, green or dry sand. Have been general foreman for 20 years with practical experience in all foundry details. Address: Box 687, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Desires position as General Foreman or Superintendent. Gray Iron or Nonferrous. Practical man. Jobbing or production. 27 years experience. New York State preferred but not essential. Address Box 653, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST-FOUNDRYMAN

Age 31. Recently returned from Brazil. Principal experience in malleable iron foundries, both mechanized and unmechanized plus additional experience in steel and grey iron. Will locate in or out of U.S.A. Address: JAMES BAXTER, 128 SPRINGFIELD AVE., MERCHANTVILLE, N. J.

Positions Wanted

GREY IRON FOUNDRYMAN

Available. Capable, qualified and experienced to direct all phases of foundry activities. Light to medium heavy work. Green and dry sand. Well versed in cupola operation and metallurgy. Fifteen years in present executive position. Middle aged. Good appearance. Pleasing personality. Address: Box 603, FOUNDRY, Cleveland 13, Ohio.

ENGINEER

Graduate engineer with 12 years' experience in jobbing and production iron, malleable and steel —equipment planning, construction, plant engineering, methods, rigging, scrap reduction, trouble shooting. Supervisory experience in molding, pouring and iron melting. Presently employed. Prefer midwest or west location. Address: Box 666, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Experienced in gray iron and some nonferrous on both production or jobbing basis. Exceptional background of practical and technical training. Cost minded and have the best in references. Eighteen years of executive background. Address: Box 707, FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALES MANAGER $10,000
Plus bonus. Large manufacturer of steel valves, fittings, boilers, heat exchangers, ice and refrigerating machinery.

FOUNDRY MANAGER To $15,000
Production Gray Iron, 200 tons daily. Supervisory, administrative experience.

SUPERINTENDENT To $7,500
Aluminum, magnesium, permanent mold. Handle shop planning, supervision.

SUPERINTENDENTS To $8,500
(1) Gray Iron; Non-Ferrous pump and pressure work. (1) Machy. castings to 1 ton, non-mechanized. (1) Machy. to 3 tons. (1) Mechanized lite gray iron.

FOREMEN To $6,500
Molding; Coreroom; Cleaning; Melting.

METALLURGISTS To $6,000
Positions for Juniors, Seniors. Malleable, Gray Iron, Non-Ferrous plants.

MAINTENANCE SUP'T. To $8,500
Exp'd. all electrical, mechanical.

EMPLOYMENT MANAGER To $5,500
Steel foundry. Handle department.

OTHERS IN ENGINEERING
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Phone, write or wire:

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SALARIED PERSONNEL

$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

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$3,500 to $35,000. We offer the original personal employment service (established 41 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. Address: **R. W. BIXBY, INC., 101 DUN BUILDING, BUFFALO 2, NEW YORK.**

CLASSIFIED ADVERTISING

Available Capacity

OPEN CAPACITY

We have available capacity to produce castings up to 500 lbs. each in small lot quantities. Send inquiries to: SUPERIOR FOUNDRY & MACHINE WORKS, P. O. BOX 549, HOPEWELL, VIRGINIA.

AVAILABLE CAPACITY

Patterns and driers, complete shop service. Located Near Detroit. Prompt delivery on first class work. Address: Box 698, FOUNDRY, Cleveland 13, Ohio.

AVAILABLE CAPACITY

We have open capacity for producing gray iron castings, squeezer or light floor work. Address: BADGER IRON WORKS, MENOMONIE, WIS.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Our expansion program which includes another sand casting foundry allows us to offer approximately 60,000 pounds magnesium castings per month—civilian or defense. Complete pattern facilities, wood and metal, also machine shop. Quotations by return mail.

AMERICAN MAGNESIUM CASTING CO.
3866 ELIZABETH LAKE ROAD
PONTIAC, MICHIGAN

Wanted-To-Buy

WANTED

Tabor squeeze stripping and jolt squeeze stripping molding machines.
Steel apron conveyor for hot castings, 18", 20", 24" or 30" wide.
Also Pottstown tapping machines.
State age, condition and price.

NATIONAL FOUNDRY CO. OF N. Y., INC.
10 SANDFORD STREET
BROOKLYN 5, NEW YORK

WANTED TO LEASE
OR PURCHASE

Medium-sized
Modern equipped
FOUNDRY

Preferably in New York metropolitan area or vicinity. Up-to-date metallurgical testing facilities desirable. Submit complete details.

BOX NO. 692

FOUNDRY CLEVELAND 13, OHIO

WANTED

FOUNDRY EQUIPMENT of all types.

We are Equipped to Dismantle.

ALLIED MATERIALS HANDLING CO.
4657 SPRING GROVE CINCINNATI 32, OHIO

WANTED

SANDSLINGER WANTED—Junior Tractor. Address Box 656 FOUNDRY, Cleveland 13, Ohio

Wanted-To-Buy

WANTED

BRIDGE CRANES

ARNOLD HUGHES COMPANY

765 PENOBSCOT BLDG. DETROIT 26, MICH.

WOODWARD 1-1894

URGENTLY REQUIRED

(1) used tensile testing machine. Capacity up to 120,000 lbs. to test dumbbell type grey iron test bars. Address BOX 672, FOUNDRY, CLEVELAND 13, OHIO.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

WANTED

CUPOLA BLAST CONTROLS

Jeffrey aerator or similar equipment for 24" belt capable of handling 70 tons of sand per hour. Bottom-pour ladles, 1, 3 or 5-ton capacity. Address: Box 674, FOUNDRY, Cleveland 13, Ohio.

MULLER WANTED

No. 1 Simpson muller. State price and motor voltage. Address: M & H FOUNDRY CO., R 18 ERICSSON ST., DORCHESTER 22, MASS.

WANTED

1—28" or 24" Cincinnati Bickford Super Service upright drill press or equivalent
1—Barnes Model 242 upright drilling machine or equivalent
1—Cleveland tapping machine model F2 or equivalent

SAVANNAH MACHINE & FOUNDRY CO.
FOUNDRY DIVISION
SAVANNAH, GA.

Foundries For Sale

FOR SALE

Gray iron foundry in Ohio 35 miles from Cincinnati. Cement block building three squares from railroad. Two manual cranes 18' span 75' runway; five squeezers; 34" cupola; air compressors; 4' muller; sand blast; mill; grinders; core oven; core sand mixer; air rammers; aluminum and wood flask and jackets. T-rail and electric hoist for charging. Address: L. C. KIRK, 401 HAZEN STREET, LUDLOW, KENTUCKY.

FOR SALE OR LEASE

Silica sand property located on railroad facilities in Lancaster County, Pennsylvania. Easily accessible and proven good grade of silica sand for foundries and other industrial uses. Address: Box 705, FOUNDRY, Cleveland 13, Ohio.

SOIL PIPE FOUNDRY FOR SALE

2" and 4" pipe, 75 different fitting patterns. All master patterns for machines, flasks and fittings. Capacity $1000 per day. Real bargain.

HERBERT J. BROWN

2008 PORTLAND AVE. SHREVEPORT, LA.

FOR SALE

Wisconsin nonferrous foundry and manufacturing, 60 miles from Chicago. Have large volume of rated orders. With increase in government expenditures, you should clear this in one year. Price $55,000. Retiring. Address: Box 504, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY—GRAY IRON

Brick and steel foundry with two clear spaces 80 x 320 ft. with overhead monorail, story height 13 ft. 6 in., gable 23 ft., attached building 40 x 50 ft., story height 15 ft. 6 in. and 13 ft. 4 in., has two No. 7 Whiting cupolas 72 in. in diameter. Contains equipment, ideal for mechanized operation, plenty dumping ground, built 1917, composition roof, vicinity population about 9000, near center of U. S. population, expect natural gas this year, served by two major railroads, water transportation available, city hydrant fire protection, land for expansion. Subject to withdrawal without notice. Address: Box 358, FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOUNDRY FOR SALE

$18,000—completely equipped iron foundry in large Western Michigan city. Includes going business, equipment and inventory. Long-term lease has very reasonable rental. Excellent opportunity for right party. Property may be purchased if desired. Address: Box 668, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE

Spokane, Washington. Only electric steel foundry in large industrial and mining area. One acre on railroad. New cement block building 152' by 40'. Cement floor—plus compressor and transformer room, electric furnace, 40' crane, other equipment. Illness forces sale. Full price $50,000. Only $18,000 down—easy terms. Address: HELEN BRUCE, EAST 4044 PACIFIC AVE., SPOKANE, WASHINGTON.

SMALL BRASS & ALUMINUM FOUNDRY

For sale in large Midwest industrial city. Excellent business, room for expansion. Only brass and aluminum shop within 90 mile radius. Price $8500. $5000 down, balance terms. Price includes land, nearby new building and equipment. Rare opportunity. Address: Box 641, FOUNDRY, Cleveland 13, Ohio.

SMALL FOUNDRY FOR SALE

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.

FOR SALE

Established going grey iron foundry in middle west, 15 ton capacity per day, fully equipped. $45,000 complete. Address: Box 665, FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY
Located in Northeastern Ohio. Well equipped with good volume of orders on hand. Low rent. Priced at $20,000. Address Box 649, FOUNDRY, Cleveland 13, Ohio.

FOUNDRIES FOR SALE

IRON FOUNDRY. Jobbing foundry producing 15 tons daily on molding machines. Excellent equipment and organization. Price reasonable. IRON FOUNDRY producing high quality castings. Machine and floor molding. Modern equipment. Price $90,000.

EDWARD H. ZOLL

FOUNDRIES SOLD AND LEASED

790 BROAD ST. NEWARK 2, N. J.

SMALL FOUNDRY FOR SALE

Complete foundry, well equipped. Main building 60' x 110'. On railroad. Prompt possession. Priced right. Terms can be arranged. Write or wire:

PRECISION FOUNDRIES, INC.

BOX 2527 TULSA, OKLAHOMA

FOR SALE AS GOING BUSINESS
MODERN BRASS PRODUCTION FOUNDRY

Located Northern California. Consists of roller conveyors to shake-out pits, bucket conveyor to sand muller and synthetic moisture controlled sand, overhead pouring system, wheelabrator and modern furnaces. One owner since 1920, now retiring.

Sales App. $250,000 per year.
Replacement cost $60,000.
For quick sale $30,000.
One half down to responsible party.

BOX 686

FOUNDRY CLEVELAND 13, OHIO

Opportunity

OPPORTUNITY

Mechanical Engineer has $15-18,000 to invest with services in small going plant. Address: 675, FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

2—24" x 30' Belt Conveyors 5 H.P. motor 220/440V.
1—Plain Air Jolt Machine Johnston & Jennings 42" x 50" table 10" cyl.
2—#405 Osborn Rollover Molding Machines. A-1 cond.
2—#814-P Osborn Jolt Squeeze Strippers, 14" squeeze cyl., 700# jolt cap., like new.
2—#602 Osborn Jolt Rollover and Pattern Draw, A-1 cond.
2—#147-1 Osborn Rockover and Draw Machines, specially built for long jobs, A-1 cond.
1—Herman Rollover Molding Machine, 18" cyl. 40" x 60" table, like new.
1—Herman Rollover Molding Machine, 22" cyl., 42" x 72" table, A-1 cond.
2—Herman Jolt Stripper Molding Machines, 40" x 72" table, ser. #4109, 4110, A-1 cond.
5—#103 Milwaukee Jolt Squeeze Molding Machines, A-1 cond.
1—Tabor 10 H.P. Abrasive Cutoff sawtable—like new.
1—#94 Osborn Core Blower—new.
4—SB-12 International Core Blowers.
1—Pangborn 28 cu. ft. Rotoblast, Type CK with Power Loader.
1—Pangborn 12 ft. dia. Tableblast No. 30 complete with Dust Collector.
1—Dust Collector Parsons #118 complete with 20 H.P. motor & blower.
4—Tumbling Mills, 30" x 60" with 15 H.P. motor.
2—Double Stand Grinders with 10 H.P. motors.
1—40 H.P. Air Compressor, Pennsylvania water cooled.
Misc. Other foundry equipment.

Steel Flask Equipment.

98—	19" x 26"	3" x 6" drag	4" cope
180—	19" x 16"	3½" drag	4½" cope
28—	17" x 27½"	4" drag	4" cope
63—	22" x 28"	4" drag	4" cope
30—	14" x 30"	3" drag	4" cope—Sterling-New
12—	16" x 27"	4" drag	4" cope
10—	24" Rd.	5" drag	9" cope

All copes are barred

1—Pangborn air shot blast room 11 ft. dia., air operated turn table with dust collectors. A-1 condition.
1—Beardsley & Piper 13 ft. tractor type sand-slinger, 19" dia. ramming head, 8 ft. riddle arm, 4 ft. ramming arm, hoist jibs on power, sand leveling device. Like new.
2—Cupolas No. 5 and 9.
1—Bartlett & Snow bucket elevator 60 ft. high, bucket 5" x 7½" x 4½" deep mounted on heavy chain. 5 HP 220-440 volt, 3 ph. 60 cycle.
1—Bartlett & Snow chain conveyor 58 ft. long 6" wide, 7½ HP 220-440, volt, 3 ph., 60 cycle.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

15019 SARANAC RD., CLEVELAND 10, OHIO

TELEPHONE—GLENVILLE 1-1222.

CUPOLAS

2 No. 7 Modern Equipment Co. cupolas with inclined charger, weigh hopper, scale and blower. Almost new—for price and details write: BOHN ALUMINUM & BRASS CORP., 1400 LAFAYETTE BLDG., DETROIT, MICH.

FOR SALE

MOLDING MACHINES

1—International type "G" 24" x 10", Portable
2—International type "F" 27" x 12", Stationary
1—Simplicity type "S-S" 4' x 8' Vibrating Screen, 5 HP A.C. Motor
2—Royer Size "D" Screenarator, Portable
1—B. & P. Size "S" Screenarator

RAY P. SCULLY

SCULLY MACHINERY & EQUIPMENT CO., NOT INC.

767 MILWAUKEE AVE. CHICAGO 22, ILL.

PHONE: CANAL 6-0314

CLASSIFIED ADVERTISING

For Sale

FOR SALE

5—Rockover Hand Draw Rockover Core Machines.
8—275J Osborn Jolt Squeezers.
2 HP to 20 HP Centrifugal Blowers.
Brass and Aluminum Melting Equipment—All Kinds.
12—Ingersoll Rand Floor Type Pneumatic Rammers.
3—Cast Iron Slag Ladles, 42" dia. x 64" high. Worm Geared Iron Ladles.
610B Johnson & Jennings Portable Rollover. Table 24 x 30, 10" Draw.
Tabor Rollover, 36 x 50 Table.
Sand Cutters, Electric & Gasoline Driven.
3—1 Yard Capacity Penn Dump Buckets, 30 x 40 x 50".
1—Molders Friend with new extra cutting reel—perfect condition.

SEND FOR FOUR PAGE LISTING.
UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD ST.
SHILLINGTON, PENNA.
R. B. HARRISON MGR, FOUNDRY DEPT.
PHONES—READING 30311—40146

FOR SALE
SAND BLAST EQUIPMENT

Pangborn 6' swing table $3000.00.
Pangborn Rotoblast cabinet, type ES-213. Used for cleaning propeller blade. Price 30% of list.
Pangborn Tumble Blast Barrels, Models 1GF Cap. 1 Cu. Ft; 2-GF 2½ Cu. Ft. Cap. Air type.
Wheelabrator 6' air table $1500.00.
Wheelabrator—27 x 36 complete with dust collector, blower, motors. A honey—$4000.00.
Wheelabrator #1 Tablast 4" dia. with tables and dust collector—$3250.
Sand Blast Cabinets, pressure-tanks, dust collectors and blowers.

DIAMOND SALES INC.
5654 W. JEFF. AVE.
DETROIT 9, MICHIGAN

FOR SALE

Sly airless table—Demmler #1 coreblower—large Herman rollover—Davenport rollovers—Cylinder ladles made by Modern Equipment—Royer sand mixers—Pattern makers machines, reasonable priced. Address: Box 683, FOUNDRY, Cleveland 13, Ohio.

RECEIVING LADLES

One—Whiting 2500# geared cylindrical
One—Modern 1500#
Both in good condition. Reasonably priced and can be inspected at:

WELLS MFG. CO.
SKOKIE ILLINOIS

FOR SALE

3—"G" Rollover Machines 20 x 8.
2—Osborn J-75 Jolt Squeezers 10".
1—Sprue Cutter with 2 HP Motor.
1—North American Blower with 15 HP Motor, 2100 C.F.M., 16 oz. pressure.
6—10" New—Haynes Jolt Squeezers.
6—12" New—Haynes Jolt Squeezers.
1—Osborn Molding Machine Model 342-4.
1—#36 Osborn Core Draw Machine.
1—Lyon-Raymond Hyd. Lift Truck 2500 lb. capacity.
5—New, 1¾" Osborn Vibrators.
300 ft. of Good Used ¾" Air Hose in 30 to 75 ft. lengths.
10—New, Squeeze Valves and Handles and 10—New Jolt Knee Valves for Milwaukee Jolt Squeezers.
3—Adams Squeezers.
1—1000 lb. Worm Gear Covered Ladles.
1—24 x 48 Tumbling Barrel.
1—#55 Demmler Core Blower.
1—American Sand Cutter Machine Size 89/70 M.
4—Modern pouring devices.
1—International J.D.P. jolt stripper.
42 Set—Truscon Pressed Steel Flasks, 19 x 20, 8 Cope, 8 Drag
42 Set—Truscon Pressed Steel Flasks, 22 x 23, 10 Cope, 10 Drag
97 Set—Truscon Pressed Steel Flasks, 15 x 20, 8 Cope, 3 Drag
4 Set—Truscon Pressed Steel Flasks, 22 x 24, 11 Cope, 9 Drag
37 Set—Truscon Pressed Steel Flasks, 16½ x 33, 8 Cope, 3 Drag
9 Set—Truscon Pressed Steel Flasks, 12 x 27, 7 Cope, 3 Drag
1 Set—Truscon Pressed Steel Flasks, 20 x 22, 10 Cope, 10 Drag
5 Set—Round Pressed Steel Flasks, 25" Dia., 10 Cope, 4 Drag
1 Set—Round Pressed Steel Flasks, 32" Dia., 10 Cope, 4 Drag

HAYNES FOUNDRY EQUIPMENT CO.
814 ADA ST. KALAMAOO 52, MICH.

FOUNDRY EQUIPMENT FOR SALE

Champion Core Blowers CB 12 Serial No. 6736
Champion Core Blowers CB 15 Serial No. 6738
Champion Core Blowers CB 400 Serial No. 6744
The above core blowers were purchased new in 1945 and have not been in use. They are a good buy for a party who needs core blowers.
We have four elevators for sale as follows:
Elevator D 29' Chain 58⅝' Dual Chain
Elevator F 43' Chain 86' Dual Chain
Elevator S 40' Chain 84' Dual Chain
Elevator R 47' Chain 95' Dual Chain
There are four speed reductors as follows:
(3) Horsburgh & Scott Worm Gear Speed Reducers Series WB2400, Class I, Ratio 45:1 17 HP Input, Speed 1750 R.P.M.
Two, Serial C1563 and
One, Serial C1648
(1) Horsburgh & Scott Worm Gear Speed Reducer Series WB2000, Class I, Ratio 45:1 11.5 HP Input, Speed 1750 R.P.M.
Serial No. C640
These elevator casings are 4'-6" x 2'-6", the elevator buckets are 8" x 19" x 7" deep, Farrell No. 85, Mounted on chain with 3 1/16" pitch.

FRANK FOUNDRIES CORP.
MUNCIE, IND.

FOR SALE

Pangborn Dust Collector—Complete with 3900 sq. ft. Screen No. 483 Type CH, Exhausted No. 270 Type KT-7, 30 H.P. Motor 3-phase 60 cycle 220/440 volts. A-1 Condition. Used only one year.

HUBLEY MANUFACTURING CO.
LANCASTER, PA. PHONE 4-2691

FOR SALE

1—#6 Modern Cupola 66" D. wind drum top ¼" steel sec. ¾" x 7' steel base. 12' support bms and angle strips for concrete bottom. Height 60'. Turbo blower with 60 HP, 1200 RPM mtr. 440 AC. Foxboro controls.
2—¾ Yd P&H Sgl. line Clamshell buckets.
1—3 ton Shepard Form 23 Mtr. driven trolley hoist. PB control for 440 AC.
1—10 ton cap. 3 mtr. OET Crane Harnischfeger 70' 220 AC.
1—ditto 7½ ton 48'.

HAWKINS & COMPANY
78 E. ADAMS ST.
CHICAGO 3, ILL.

FOR SALE

1—Whiting cupola #8—used less than 200 hours. Best offer. 2—Allis Chalmers 75 HP—7500 C.F.P.M. 16 oz. blowers—sacrifice. Address: JACK RODEGHIER, 712 N. RAYNOR AVE., JOLIET, ILL.

FOR SALE

Slightly used sand blasting equipment, No. 1, type CD-1 dust collector 700 CFM capacity. Pangborn GF suction feed blast barrel 1½ cu. ft. capacity. Address: M. LINKMAN & CO., 1150 WEST FULLERTON AVENUE, CHICAGO 14, ILL.

THREE TON CHAIN HOISTS

Chester spur gear hoists, roller bearing type, 10' lift in original factory boxes.
Price, F.O.B. Brooklyn, N. Y. .....$98.00 each

COASTAL MACHINERY COMPANY
1775 BROADWAY NEW YORK, 19, N. Y.

DUST COLLECTOR AND FAN HOUSE

Parsons #138 dust collector and 10'8" fan house, complete with fan and motor. In excellent shape. "AS IS AND WHERE IS", Greensburg, Indiana. For full details write:

BOHN ALUMINUM & BRASS CORP.
1400 LAFAYETTE BLDG.
DETROIT 26, MICHIGAN

FOR SALE

One Whiting 3-ton capacity heated metal mixer without pulverizer. Never used. Address: CONTINUOUS METALCAST CO., 17 JOHN STREET, NEW YORK 38, NEW YORK.

FOR SALE

Equipment for the manufacture of soil pipe and soil pipe fittings. Including flasks and arbors. 58" cupola and blower. Address: MINNESOTA PIPE & FOUNDRY CO., ANOKA, MINNESOTA.

FOR SALE

MOLDING MACHINES
2—Deuscher Stationary jolt squeeze
1—Osborn 74W Plain Squeeze Portable
2—Osborn 75W Plain Squeeze Portable
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers
BLOWERS FOR CUPOLAS AND FURNACES
10—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
1—#47 Connersville-Acme
2—#59 Connersville-Acme
1—Connersville rotary 24 cu. ft. per rev. 6200 C.F.M.
Maxon-Premix Blowers for Gas ¼ to 1 HP
METAL MELTING EQUIPMENT
5—1000# open flame brass melting furnaces, gas fired
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired
New 32" to 41" dia. shell cupolas made to order.
TUMBLING MILLS AND SAND BLAST
1—Pangborn style GJ-1 rotoblast barrel complete with Pangborn style FM automatic loader. Load capacity approx. 16 cu. ft.
1—Pangborn No. 2 GH direct pressure type sand blast barrel, motor driven. Complete unit.
1—Pangborn Sand Blast Unit, including generator tank, shot cleaner, bucket elevator. Suitable for use with room
MISCELLANEOUS
1—American sand cutter 50" blade
1—2-Station Handy Sandy
1—Royer NC-2 sand separator
1—Beardsley & Piper 3 HP Wheelabrator
1—#1 Blystone sand mixer, motor drive
2—#16 Roto-clone units complete
25 Tons steel flasks in sizes from 26 x 26 to 60 x 60
4—Heavy Duty Flexible Shaft Grinders 2 HP
Complete stock of rebuilt mill and dust exhaust blowers

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

MOLDING MACHINES
3—Tabor Shockless 22" x 30" Jolt Rollover Air Clamps
3—Tabor Shockless 22" x 40" Jolt Rollover Air Clamps
1—Tabor Shockless 30" x 50" Jolt Rollover Air Clamps
1—Tabor Plain Jar Flask Lift Open Ends
3—Tabor Top Squeeze
1—Spo #9032 Power Rollover Trunnion Type
3—Spo 2114 P Jolt Squeeze Pushoff
2—110PJ Jolt Squeeze
SANDBLAST GENERATOR: 1—1000# Ruemelin

THE E. R. FROST COMPANY
1179—15th AVENUE S.E.
MINNEAPOLIS 14, MINN.
TEL: GLADSTONE 7966

FOR SALE

1—Six foot sand muller, complete with motor, starter, loader, etc. Can be seen in operation. Address: ACME FOUNDRY & MACHINE CO., BLACKWELL, OKLAHOMA.

FOR SALE

1—Sklenar Oil Fired Single Burner Furnace, 750# capacity, in good condition, $750.00, F.O.B. our plant.
1—Champion Core Blower, Size CB-12, complete with Air Clamp. Purchased new in 1946 but never used. Priced: $1,560.00, F.O.B. our plant.

SCHNACKE MFG. CORP.
1016 E. COLUMBIA ST. EVANSVILLE 7, IND.

For Sale

FOR SALE

Osborn #91-10 core blower with sand reservoir of 8½" x 15" opening, blow plate to suit, table wearing stool, horizontal clamps, all valves and fittings integral with the machine and equipped with manually controlled hand foot operating valve. This unit purchased new in 1944; has been slightly used and in very good condition. Address: Webster Manufacturing, Inc., Tiffin, Ohio.

FOR SALE

TURBO BLOWERS (3 Phase, 60 Cycle)

cfm	Pressure	Make	Motor H.P.	Volts	Speed
3500	40 oz.	Spencer	60	440	1800
2250	24 oz.	Spencer	25	220/440	
2700	16 oz.	Spencer	20	220/3/60	1750
1300	16 oz.	Spencer	10	220/3/60	1750
650	16 oz.	Spencer	10	220/3/60	3600
550	20 oz.	Spencer	5	220/3/60	3475
450	40 oz.	Spencer	7½	220	1750
400	16 oz.	Spencer	3	220/3/60	3500
PRESSURE BLOWERS (3 Phase, 60 Cycle)					
9100	7" SP	Sturtevant			1900
4500	16 oz.	G. E.	30	440	3600
8150/6250	7 oz.	Sturtevant	15	220/440	1800
2500		Bishop & Babcock (40½ x 50 outlet)			
2300	1" SP	Clarege	3	220/440	1800
800	8 oz.	Nth. Amer.	3	220	3600
660	20 oz.	AllenBillmyre	7½	440	3600
450	6 lb.	A&B	30	220/440	3450
400	4.3 oz.	Spencer	2	220/3/60	3500
340	20 oz.	AllenBillmyre	3	440	3600

MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND, OHIO

FOR SALE

1—10 ft. wide floor type binks spray booth with dynaprecipitor unit complex with 460 gal. GPM pump. 42 inch dia. exhaust fan and stack, motors and starters. Also, DeVilbiss spray gun equipment with 15 gal. pressure feed tank. Used about 16 months, good as new.

UNITED STATES PIPE AND FOUNDRY CO.
P. O. DRAWER 311 CHATTANOOGA 1, TENN.

FOR SALE

1—Osborn core blowing machine—No. 91-15, almost new, complete with sand reservoir 8½" x 12", opening, blow plate, horizontal clamps, table wearing plate and manually controlled hand and foot operating valves. Excellent condition. IMMEDIATE DELIVERY.

ARCADE MALLEABLE IRON COMPANY
WORCESTER, MASS. Tel: 3-5414

FOR SALE

Stationary Sandslinger with Plate Feeder
B & P Push Off machines
B & P Turntable
Simplicity Screenerator & Shakeouts
Champion, Osborn, & Demmler Core Blowers
Robinson Core Grinder
#405 Osborn Molding machine
Intl. Jolt Squeeze Pin Lift machine
7½ HP Marschke Grinder
15 HP Variable Speed Snag Grinder
Dings #0 Magnetic Separator
Adams Snap Flasks

BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO
TELEPHONE: FAIRMOUNT 1-1186

FOR SALE

IMMEDIATE DELIVERY

1—Ransohoff Cleaning Mill 48" x 72", Side Loading, Side Unloading—Star Return—with Sand Handling Conveyor complete with tank, pump, switches and motors.—Excellent Condition.

FOUNDRY HOIST

1—3 ton R & M 2 motor AC foundry hoist.

PRESSURE BLOWERS

4—2010 CFM, 29 oz pressure, 12" discharge 15" suction Spencer Turbo Compressor, with 25 HP. 220/440 v. 3 ph. 60 cy. Motors.

DUQUESNE ELECTRIC & MFG. CO.
6428 HAMILTON AVE.
PITTSBURGH 6, PA.
TELEPHONE MO-1-5800

FOR SALE

60 aluminum perforated core plates at $5.00 each. Size 11½" by 19½".
1—15 square Adams wood slip flask 5" cope 4" drag. Like new.

BOX 695

FOUNDRY CLEVELAND 13, OHIO

For Sale

FOR SALE

2—Osborn Jolt, Squeeze, Rollover, Draw Molding Machine
1—Schneible Multi-Wash Dust Collector for 6500 CFM.

GUNITE FOUNDRIES CORPORATION
ROCKFORD, ILLINOIS

FOR SALE

1—Used 60" x 144"—jolt rollover—draw; Herman Moulding Machine. For further information contact:

MR. A. BOLIN—GR 3556
CROWN IRON WORKS COMPANY
1229 N.E. TYLER STREET
MINNEAPOLIS 13, MINN.

FOR SALE

40—10' sections of Lamson roller gravity conveyors, each section 10' long, 2½" diameter rolls #10 gage 24" long rolls on 3" centers in high position between 4¼" x ¼" thick, uniframe side members. Never used, will sell for $95.00 each section, F.O.B. our factory. Present price $118.00 each F.O.B. Syracuse. Address: THE LUDLOW VALVE MFG. CO., INC., TROY, NEW YORK.

FOR SALE

1—Coleman tower oven, 27 carriers 84" x 25", overall height of oven 45', 9'8" long, 9'2" wide, recirculating air type combination oil and gas fired—45 minutes to 180 minutes, baking cycle temperature 0 to 500 degrees Fahrenheit. Like new. Address: REDSTONE INDUSTRIES, INC., UNIONTOWN, PA.

FOR SALE

1—20 x 27 Wheelabrator, rubber conveyor belt. Excellent condition—with spare parts—$2500.00.

1—Sklenar furnace, twin burner oil fired. Condition excellent—$950.00.

BUCK IRON COMPANY
ROUTE #1 QUARRYVILLE, PA.

FOR SALE

No. 8 cupola and charger complete—including weigh hopper, transfer car and bucket. New in 1948.

AUBURN FOUNDRY, INC.
AUBURN, INDIANA

FOR SALE

Sand blasting machine, "Sanstorm". Model "AHW", portable, capacity: Sand—350 lbs., grit—875 lbs. Equipped with 12½' 1" hose, hose connection and long life nozzle. Never used—our floor model—$300.00 f.o.b. Chicago. Address: FEDERAL FOUNDRY SUPPLY CO., 4600 E. 71st ST., CLEVELAND 5, OHIO.

FOR SALE

ROLLER CONVEYOR

all sizes & types

ALLIED MATERIALS HANDLING COMPANY

4657 SPRING GROVE CINCINNATI 32, OHIO

FOR IMMEDIATE SALE

30—10 ft. lengths of 12" conveyor, with 1.9" dia. x 12" long rollers, mounted on 3" centers in 4" channel frames, plain roller bearings and 8—10 ft. lengths of 18" conveyor, with 1.9" dia. x 18" long rollers, mounted on 3" centers in 4" channel frames, plain roller bearings.

FLYNN AND EMRICH COMPANY
BALTIMORE 2, MD.

FOR SALE

1—Used model "M" Beardsley & Piper screenerator in good operating condition. 3 phase, 60 cycle, 220 volt, motor. Price $400.00 f.o.b. Little Falls, New Jersey. Also have good stock of new repair parts for this machine which may be purchased.

NORTH JERSEY FOUNDRY CO., INC.
453 MAIN STREET
LITTLE FALLS, NEW JERSEY

For Sale

FOR SALE

Pangborn—AIR SHOT BLAST ROOM, complete with 11 ft. dia. turntable, all motors, controls, etc. Ready for operation. Model U.S.I.
Beardsley & Piper—13 ft. TRACTOR TYPE SANDSLINGER, 19" dia. ramming head, 8 ft. riddle arm. Like new.
Osborn—JOLT ROLL OVER MACHINE, Model 405, 19 x 56
Osborn—JOLT STRIPPERS, Model 405, 21 & 33
Osborn—JOLT ROLL OVER, Model 406, 36 x 24
Osborn—JOLT STRIPPER, Model 406, 36 x 52
Herman — 6000# series ROLLOVER-PATTERN DRAW MACHINE 50 x 60 table, 15" cylinder, 40 x 60 table independent Jar Machine as complete unit.
(2) Herman—6000# series JOLT-STRIP MACHINES, 48 x 54 table, 12" draw.
Modern Eqpt. Co. CUPOLAS #9
R-C POSITIVE BLOWER 12 x 20, 20 hp
R-C POSITIVE BLOWER 22 x 66, 75 hp
MIXING LADLES, 1000# cap. to 4000#
V.C.G.-3 SUPER GYROSET SHAKE OUT, 6' x 8' deck, complete
(2) #276J Osborn SQUEEZER MACHINES—large size
(5) SPO—SQUEEZER MACHINES—regular size
(2) Osborn SQUEEZER MACHINES—regular size
(3) PKL 14 Int. JOLT SQUEEZE PIN LIFT MACHINE
PKL 12 Int. JOLT SQUEEZE PIN LIFT MACHINE
712J Osborn JOLT SQUEEZE PIN LIFT MACHINE 12"
Am. SAND CUTTER, Model AA, #1111, 7½ hp, 220 V
(2) Webster & Perkins PEDESTAL GRINDERS, 1200 rpm
Everett STAND PEDESTAL GRINDER
Gardner GRINDER, 52" horizontal, 20 hp
Walker Turner DRILL
TUMBLAST CABINET, Pangborn, model 1172A, ser. #7412911, gravity feed or air blast, 30" x 40" barrel model 2 GD1, 2.7 rpm. Uses sand or shot. Good Cond. All motors A.C. $1000.00 fob.
SAND SCREENARATOR, Beardsley & Piper Model S, 3/60/220/440 volt, steel wheels. $325.00 fob.
Tabor — PORTABLE SHOCKLESS JARRING ROLL OVER & PATTERN DRAWING Machine 24" x 16" $350.00 fob.
AIR COMPRESSOR, Sullivan 11 x 10, 40 hp AC motor and starter $750.00 fob.
MAGNETIC SEPARATOR, Ding's Mfg. 12" x 18" 110 V., S. Ph. motor, 2 hp. Ser. R5771. $600.00 fob.
SAND BLASTING TANK, Pangborn, model 1AV11 $150.00 fob.
SPHERICAL FURNACES, Romph Mfg., cap. up to 3000#
Sly TUMBLING BARRELS
DEGREASING UNITS all sizes
AIR TOOLS
FANS & BLOWERS up to 125,000 cfm
ELECTRIC FEED RAILS & TROLLEYS
FLASKS Barnett & Pressed Steel
HOISTS Electric, hand, air 1 to 10 ton
CONVEYOR all sizes and types.
CRANES overhead & jib all sizes
MOTORS, SPEED REDUCERS, BLOWERS any size
GRINDING WHEELS all sizes
AIR COMPRESSORS from 1 hp up
FOUNDRY EQUIPMENT. Send us your inquiries.

ALLIED MATERIALS HANDLING CO.

4657 SPRING GROVE CINCINNATI 32, OHIO

FOR SALE

One Milwaukee jolt squeeze—165.3
Serial No. 12793
Can be inspected at our plant at any time.

LYCOMING-SPENCER DIVISION
AVCO MANUFACTURING CORPORATION
652 OLIVER STREET
WILLIAMSPORT, PA.

FOR SALE

And ready for instant delivery, one Pangborn rotary sand blast type LG-14-9 foot rotary table equipped with 6 rotary tables 36 inches in diameter each. And two #195 type RF center feed vane type roto blast units. Also dust collecting system and abrasive handling and reclamation system. All motors and controls are 440 volt, 3 phase, 60 cycle. This machine is practically new, in production less than six months. Priced right for quick sale. Address: Box 688, FOUNDRY, Cleveland 13, Ohio.

For Sale

MOLDING MACHINES
JOLT ROLLOVER

1—OSBORN 507-E2 82" x 60" TABLE 27" Draw—7500# Capacity.
1—HERMAN ROLLOVER DRAW 1500# 30" x 48" Jolt Rollover Draw
1—OSBORN JOLT ROLLOVER 408 HD 5'0" x 10'0" Table
2—OSBORN JOLT ROLLOVER #403-W 54" x 24" Table
1—TABOR 22" x 30" JOLT ROLLOVER DRAW
1—6000# HERMAN ROLLOVER DRAW, Table 60" x 96"
1—TABOR 22" x 30" ROLLOVER DRAW
1—INTERNATIONAL POWER ROLLOVER 30" x 42" Flat Back
2—#11 ARCADE ROLLOVER MOLDING MACHINES
1—#14 ARCADE ROLLOVER MOLDING MACHINES
10—ROBINSON ROLLOVER 18MT2S JOLT SQUEEZE & PLAIN SQUEEZE
5—OSBORN SQUEEZE MOLDING MACHINES
1—TABOR YOKE JOLT SQUEEZE 18" x 18" TABLE
15—NICHOLS 14" x 36" JOLT SQUEEZE
4—OSBORN #275-J JOLT SQUEEZE
4—OSBORN #210 JOLT SQUEEZERS
1—TABOR PLAIN JOLT 18" x 24" Table
1—7012 OSBORN JOLT SQUEEZE STRIPPER
1—#163 MILWAUKEE JOLT SQUEEZE STRIPPER

JOLT STRIPPERS

2—#3 U. S. JOLT STRIPPERS
1—JOLT STRIPPER 16" x 12"—4" DRAW
1—JOLT STRIPPER 24" x 36"—5" DRAW

HAND STRIPPERS

20—OSBORN HAND STRIPPERS 2014-16-6

HEAT TREATING FURNACES

GAS & ELECTRIC

1—WESTINGHOUSE PUSHER TYPE HARDENING FURNACE, ELEC. 500# pr. hr.

For Sale

1—ELECTRIC FURNACE CO. CONTINUOUS BRAZING FURNACE—Opening 24" W x 9½" H CONTROLS—INSTRUMENTS—COOLING CONVEYOR
2—LINDBERG 120KW #3S60s EHV SUPER CYCLONE FURNACES 1850°
2—TATE-JONES ROTARY HEARTH BILLET
1—20" x 20" x 5'6" 30KW 2200° GE BRAZING FURNACES (PUSHER TYPE)
1—STD. FUEL ENG. #331F #N2.1536 HI SPD BOX TYPE GAS FIRED.
1—STRONG CARLISLE & HAMMOND OIL FIRED 30" x 12" x 8'0" Long
1—GE DRYCOLENE GAS GENERATOR 200 CFH
2—HEVI-DUTY 120KW-1600° CAR TYPE RETORT ON CAR FAN UNDER RETORT CAR 3' x 5' HIGH
1—HEVI-DUTY ANNEALING FURNACE 24" x 24" x 10'0" 220V/3/60-1800°
1—GE ELEC. DRAW FURNACE PIT TYPE 24" x 30" Basket—32KW 220V/3/60
1—AMERICAN ELECTRIC 30KW BOX FURNACE 24" x 24" x 40"
1—LINDBERG 2530 GH CYCLONE DRAW FURNACE—GAS
2—L. & N HOMO FURNACE MODEL 9469 30 KW

MELTING FURNACES

1—SWINDEL 1 Ton ARC MELTING FURNACE with Controls. Transformer 800 KVA @ 2300 Volt. Door Charge
2—DETROIT ELECTRIC ROCKER FURNACE #350
2—MONARCH OIL FIRED #80 TILTING FURNACES—300#
2—1500#—SKLENAR TILTING TYPE
1—4000# ROMPH SPHERICAL

SALT BATH FURNACES

1—HOLDEN TYPE 212, Mod. 2S24-AC Pot size 28" x 24" dp GAS FIRED
1—HOLDEN TYPE 212, Mod. 2S24-AC Pot size 28" x 24" dp GAS FIRED
1—STD. FUEL ENG. #335F #161618RP Pot size 14" x 24" dp GAS FIRED

For Sale

GRINDERS

2—MARSCHKE DOUBLE END 15 HP HEVI DUTY 230 V DC
1—NORTON DOUBLE END HEVI-DUTY 15 HP 220/440 V AC
3—PORTABLE DOUBLE END GRINDERS 3 HP MOTOR 220V.
1—BLACK & DECKER DOUBLE END 220 V PEDESTAL GRINDER 3 HP MOTOR
1—HAMMOND 3 HP TOOL ROOM 220V DOUBLE END GRINDER 14" Wheel
1—VAN DORN DOUBLE END BENCH GRINDER 220V
1—HAMMOND 5 HP DOUBLE END MODEL ROH—220V POLISHER
1—7½ HP U. S. GRINDER 220V

MISCELLANEOUS

1—KANE & ROACH WIRE STRAIGHTENER & CUT OFF MACHINE FOR #12-#10 ¼" & ⅜" WIRE
3—ROBINSON ROTARY CORE GRINDERS
1—SUTTER CORE GRINDER
1—CORE OVEN SHELF TYPE 5' x 5' x 3'
1—CORE OVEN—ROTARY SHELF 3' x 4'
2—SPENCER TURBINES 60 HP 4000 CFM @ 32 Oz.
2—HEVI-DUTY BRANFORD FLASK RAPPERS
1—DUST COLLECTOR FOR 2 GRINDING WHEELS
1—WHITING #4 CUPOLA—1945 with IR BLOWER—3500 CFM—1.25 Pressure

SHOT BLAST EQUIPMENT

1—PANGBORN TABLE TYPE SAND BLAST CABINET TYPE MTS with 7'4" Dia. Table

MULLER

1—#3 SIMPSON MULLER

CORE BLOWERS

1—CHAMPION—CB—12
1—DEMMLER #2 & #3

SAND CUTTER

1—ROYER—N D P

PARTIAL LISTING ONLY

FOUNDRY & HEAT TREATING EQUIPMENT **NEW & USED & REBUILT**

LAND-WHITEHEAD EQUIPMENT CORPORATION
P.O. BOX 756 (PHONE 54379)
READING, PENNA.

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words or less, $2.50. Additional words 9c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $5.00. Additional words 15c each.

NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

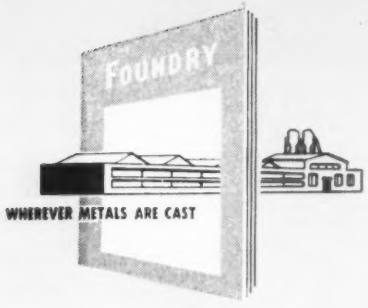
Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 15.00	$ 13.75	$ 12.50	$ 11.25
2 inches	27.00	25.00	23.00	21.00
3 inches	40.00	36.50	33.50	30.00
4 inches	50.00	46.00	41.50	37.50
5 inches	60.00	55.00	50.00	45.00
6 inches	73.50	66.50	60.00	53.50
7 inches	82.50	75.00	67.50	60.00
8 inches	91.50	83.50	75.00	66.50
1 column	110.00	100.00	90.00	80.00
Half Page	162.50	150.00	137.50	125.00
Full Page	275.00	250.00	225.00	200.00

Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

Classified Forms Close the 13th of Month Preceding Issue

FOUNDRY

Penton Building, Cleveland 13, Ohio



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FOUNDRY

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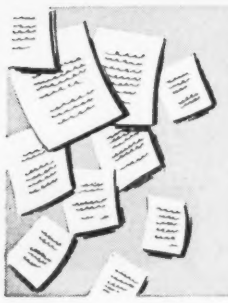
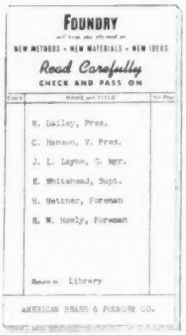


THOTS for today from the FOUNDRY Business Staff

Have You Requested Your FREE Route Slips?


FOUNDRY
NEW METHODS • NEW MATERIALS • NEW IDEAS
Read Carefully
CHECK AND PASS ON
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AMERICAN BRASS & FOUNDRY CO.

As a service to our subscribers who wish to route copies of FOUNDRY to selected individuals in the office and plant, we regularly supply gummed labels (in pad form) for that purpose. If you will send us the names and titles of personnel in your plant which you would like to have imprinted on such slips, we will be glad to make them up to facilitate your routing your copies of FOUNDRY each month. We find that it works best to limit the number of individuals to five or six on each slip. We'll be glad to send a sample route slip and form for your giving us explicit instructions on how you want them made up.

Do You Read "Ideas for Foundrymen"?

We recently administered what one of our agency friends and constructive critics calls a "shot of adrenelin" to an old feature called, "Helpful Literature." It seems to have worked and the editors who write the IDEAS catalog descriptions invite you to turn back to page 203 and help yourself to some of the many good ideas described there.

There's probably a little bull in the best of good business magazines but the first time we've looked a live one in the eye in FOUNDRY is Hydro-Blast's handsome critter as he appeared on page 185 of last month's issue. If you didn't note this impelling advertisement designed to assist in securing greater recognition for the foundry industry in Washington, we suggest that you look it up now, or write Hydro-Blast for a copy.

Chicago Again No. 1 Foundry Market Area

We have completed our biennial census of the foundry industry and (based on number of employees), the Chicago area again emerges as the number one territory with 256 foundries, 32,790 employees, and 1,041,203 net tons annual productive capacity. Chicago, Joliet, Aurora, Hammond, Kankakee, Waukegan, Batavia and Harvey are principal foundry cities in the area.

Other leading areas include: Cleveland, Pittsburgh, Detroit, Indianapolis, Milwaukee, Birmingham, St. Louis, Newark, Los Angeles, Dayton, South Bend, Cincinnati, Grand Rapids, Buffalo, Davenport, Saginaw, Philadelphia, Reading, and New York City with 76 other areas. If you like statistics or have a foundry sales problem, we'll be glad to send you more facts.

The Magic of Believing

The Editors and Business Staff of FOUNDRY have tried to convey sincerely to you our wish for your happiness this Holiday Season through the message on this month's front cover. To YOU, whoever you are, wherever you are—may you prosper at what you are doing, succeed in your ambitions in the New Year ahead.

Geo. Dogler

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Takes 2 hours to install...

gives 1 to 2 extra heats per day

CARBOFRAX rings make as tough and durable a furnace lining as you can find. They are inherently very resistant to flame erosion, spalling and cracking, and will not soften, even at high temperatures. They require minimum maintenance — go months and months with only limited patching.

Here's a cross section of a typical ring/cement lining. The ring lining is made of CARBOFRAX material. This lining is only 1½" thick — hence, there's more space for insulation, better protection against heat loss. • Castable ALFRAX cement #27 — one of the most refractory insulating materials available — is used to back up the rings. (It's easy to install — just mix with water and handle like Portland cement.) • CARBOFRAX cement #30 is rammed in the bottom and is used to top off the ALFRAX lining.

Average installation time per furnace: two hours. That's what a non-ferrous foundry reports concerning the linings used for their furnaces melting manganese bronze. They use a combination of materials—one-piece CARBOFRAX silicon carbide rings, 1½" thick, backed up with 2½" of ALFRAX aluminum oxide cement #27.

With this ring/cement combination, the time now required per heat is only 40 minutes—and even more important, it's a *consistent* 40 minutes. As a result, they can turn out one extra heat every day—two, if necessary. All this with a fuel cost (using natural gas) of just $.0015 per lb. of manganese bronze melted.

This foundry also uses a similar CARBOFRAX/ALFRAX refractories combination for a large tilting furnace melting manganese bronze and for 4 very large pot-type aluminum melting furnaces.

* * *

May we send you information on linings for your particular types of furnaces? We make rings, ring segments, and cements—lining material to fill your every need. If you will advise us of your operating conditions we will gladly send design drawings, recommendations, etc.

Super Refractories by

CARBORUNDUM

Trade Mark

Dept. A-121, Refractories Division — The Carborundum Company, Perth Amboy, N. J.

"Carborundum", "Alfrax", and "Carbofrax", are registered trademarks which indicate manufacture by The Carborundum Company.

3 HANDS MOVING AS ONE...

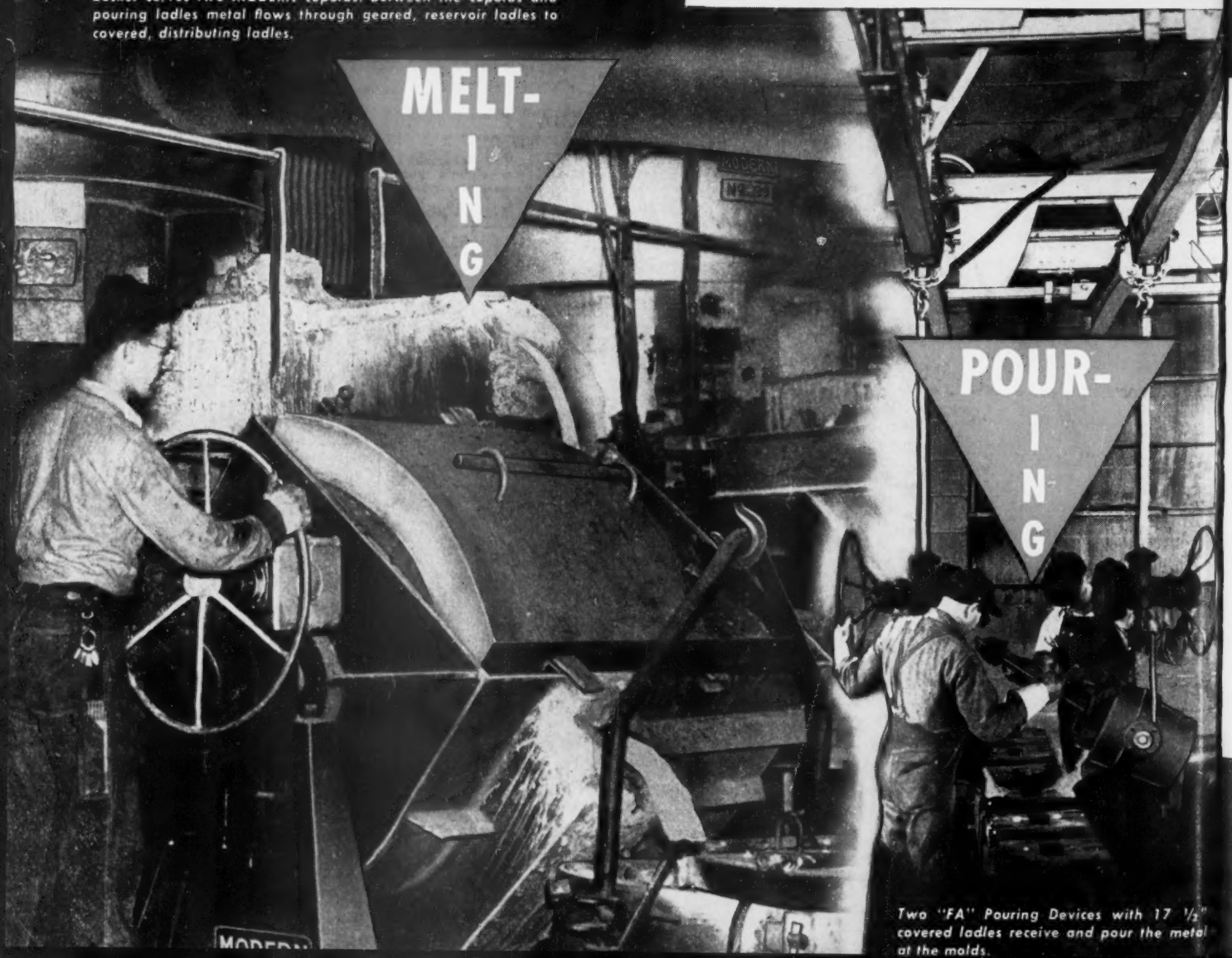
Truss type, swivel charger with SMALL-CONE SIDE-DISCHARGE bucket serves two MODERN cupolas. Between the cupolas and pouring ladles metal flows through geared, reservoir ladles to covered, distributing ladles.

CHARGING...MELTING and POURING

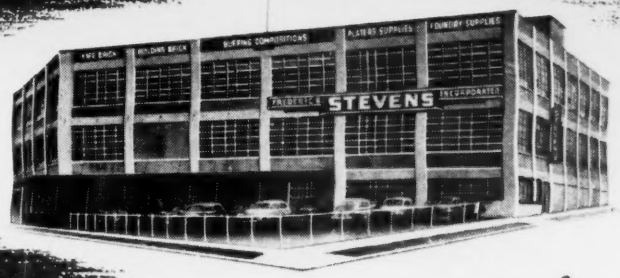
operations require closer synchronization now than ever before in foundry history: Today TIME AND METAL are on the march to prove that right will conquer might. So in the new year every casting will have to be counted toward the building up of the $4 billion volume we'll be needing. 90%* of all our durable goods will be using castings. In channeling this vital flow of metal from yard to mold MODERN engineers have acquired some valuable, foundry know-how! Literature and sound, color films are available free to all foundrymen who sincerely believe that increased tonnages—RIGHT NOW—will play a big part in bringing about peace on earth...

*FOUNDRY Research Department

MODERN EQUIPMENT CO.
PORT WASHINGTON, WISCONSIN



Two "FA" Pouring Devices with 17 ½" covered ladles receive and pour the metal at the molds.



Best Wishes for a Happy Holiday and Prosperous New Year

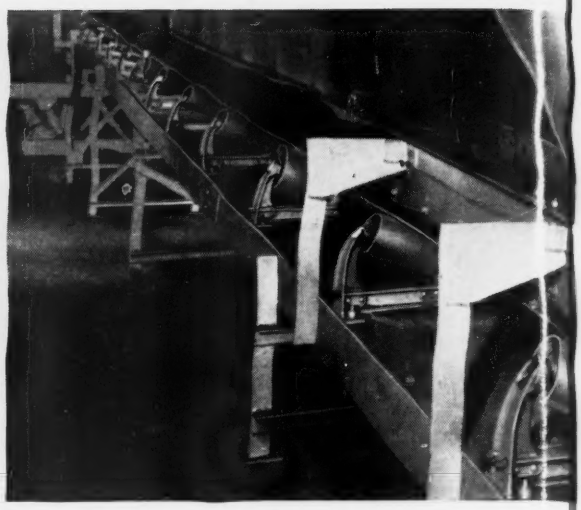
The approach of another Yuletide Season (our 69th, incidentally) is a splendid opportunity for us to express our appreciation to our friends in the foundry business—the people who have helped to make Frederic B. Stevens, Inc., a success. We sincerely hope that this Christmas and the coming New Year will find you enjoying health, happiness and good fortune. We also hope that we can continue to serve you as your source for "Everything For A Foundry."

FREDERIC B. STEVENS INCORPORATED

DETROIT 16, MICHIGAN

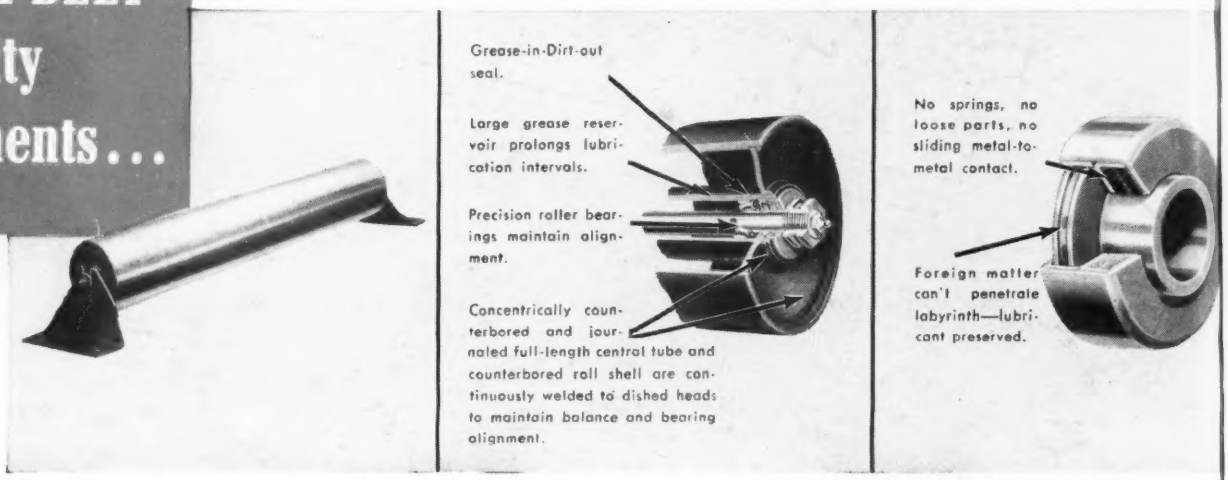
FREDERIC B. STEVENS OF CANADA, LTD.
WINDSOR • TORONTO
ONTARIO

LINK-BELT engineering experience...



Left: Sand is distributed to molders' hoppers by means of Link-Belt Belt Conveyor employing flat roll idlers. *Right:* Spill-sand is carried on troughed conveyor in tunnel under line of molding machines.

plus LINK-BELT quality components...


Grease-in-Dirt-out seal.
Large grease reservoir prolongs lubrication intervals.
Precision roller bearings maintain alignment.
Concentrically counterbored and journaled full-length central tube and counterbored roll shell are continuously welded to dished heads to maintain balance and bearing alignment.
No springs, no loose parts, no sliding metal-to-metal contact.
Foreign matter can't penetrate labyrinth—lubricant preserved.

Roller bearing L-B Flat Belt Idler. Less lubricant and adjustment. Grease-in-Dirt-out Seal.

add up to your best buy in BELT CONVEYORS

In foundries all over the world, LINK-BELT Belt Conveyors provide reliable, efficient sand handling

OBTAIN the finest in modern sand handling in your foundry. It can be as simple as calling in a Link-Belt foundry specialist while you're still in the planning stage.

Thousands agree Link-Belt builds the finest belt conveyors on the market today. And it has the most complete line of components—all types and sizes of idlers, take-ups, pulleys, plows, bearings and power transmission drives—plus related equipment, including trolley, oscillating and mold conveyors, shakeouts and other sand handling machinery.

Equally important, Link-Belt foundry specialists draw on the broadest background in the industry. They'll work with you and your consultants — help you come up with the right layout for your requirements.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,528

LINK-BELT

CONVEYORS and PREPARATION MACHINERY

FOUNDRY

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1951

The Penton Publishing Company
Penton Building
Cleveland 13, Ohio

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Ed—Editorial Q & A—Questions and Answers FD—Foundry Developments

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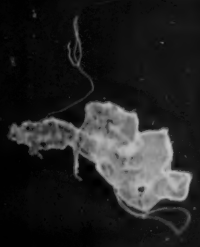
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